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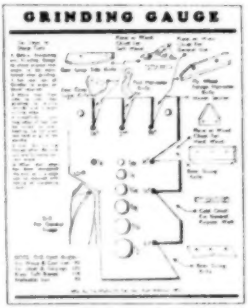

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Fort Atkinson 21, Wisconsin

The Farmer's Digest

Volume 23 August - September 1959 Number 3

How To Figure Profit Or Loss On Fed Cattle

A vital step in cattle management . .

Condensed from
National Livestock Producer

C. C. O'Mary,
State College of Washington

EVERY cattle feeder recognizes that certain basic factors contribute to the profit or loss of the enterprise.

Whether you feed a few head or many, your knowledge of the following basic steps should contribute to your livestock production and marketing program.

Margin:—The margin is the difference between the buying price per cwt., and the selling price per cwt. It can be a positive margin — when the selling price is higher than the purchase price; or a negative margin— when the selling price is lower than the purchase price.

The necessary margin is the difference between the buying price and selling price that you need to break even on your operations.

When you buy feeders, you anticipate a certain selling price. (The current fat cattle price is sometimes used as a yardstick). You can estimate fairly close the costs involved during the feeding period, and the amount of time it will take your animals to reach their grade for marketing.

Feedlot operators can make money on a narrow margin by keeping feed cost per pound of gain low, or on a wider margin

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by increasing the grade of the animals being fed, or perhaps by a combination of both low feed costs and higher grades.

How Margin Affects Profits

Let's take a 100-day feeding period and assume a 2½ lb. daily rate of gain. If the steers were bought at 750 pounds, that means a selling weight of 1,000 pounds.

Assume a buying price of $25 per cwt., and a selling price of $27 per cwt.,—a positive margin of $2 per cwt. You have paid $187.50 for the steer and sold it for $270; leaving $82.50 for various costs including feed, labor, etc.

But suppose you have a negative margin of $2. You have paid $23 per cwt. for the steers, but the selling price is $23 per cwt. This provides only $230 return on the steer which cost you $187.50, leaving only $42.50 for feed, labor, and other costs instead of $82.50.

Suppose there is no margin; that is, you bought the steer at $25 per cwt. and sold it for $25 per cwt. The selling price then will be $250 and you have $62.50 left to cover expenses.

The margin is affected by change in the grade of the steer and by a rising and falling market. Previous experience in feeding will be your best guide in determining whether or not an increase in grade can be expected. Price trends and predictions serve as a guide in estimating probable market prices at selling time.

Water sprinkled on the floor and walls of the storage room will help maintain moisture needed for satisfactory quality of eggs. But poultry scientists point out that a spray of water or an automatic humidifier will do the job better.

Size of Animal:—Suppose we use a positive margin of $2—buying at $25 and selling at $27 per cwt., but we change the initial weight of the animal to 500 pounds. Using the same 2½ pound daily gain for 100 days, we now have a 750 pound animal to sell.

The buying price of the steer would be $125 and the selling price $202.50. The difference is $77.50. This varies from our first figure of $82.50 by $5 less to cover operational costs.

Rapid Gains Boost Returns

Therefore, in this example, the size of the animal is one factor that affected the price differential and we have $5 less to cover operational costs.

In the original example, we bought a 750 pound steer, fed him for 100 days at a daily gain of 2½ pounds and marketed him at 1,000 pounds. Suppose the

rate of gain had been 3 lbs. per day, or a total of 300 pounds. This means a selling weight of 1,050 pounds and a return of $283.50 instead of a selling price of $270 for the 1,000 pound steer. Instead of having a price differential of $82.50 to cover feed. labor, etc., we now have $96.

"When I was a lad of 14 I was so ashamed of my Old Man's ignorance I could hardly stand to have him around. By the time I became 21, I was surprised how much my father had learned in the 7 years."
—Mark Twain.

Feed Costs Per 100 Pounds Gain:—Feed costs are generally the major expense in a feedlot operation. Here again, previous experience is most helpful. If you know a certain group of steers will make 100 pounds of gain from 700 pounds of feed, based on previous experience with similar animals, your chances of profit are much greater.

You can buy or grow most of your feed in advance and know the cost of ingredients of the ration. But it will be difficult for you to predict accurately the feed efficiency of the animal or its rate of gain. Buying steers from the same source each year will enable you to make a more accurate prediction of feed efficiency.

Assume that it takes 700 pounds of feed to put on 100 pounds of gain and we want to raise a 750 pound steer to 1,000 pounds in 100 days. This 250 pound gain means that it takes 1,750 pounds of feed for this steer. If the average cost of the complete ration is $50 a ton, the feed cost would be $43.75 for the steer.

If feed efficiency were 800 pounds per 100 pounds gain, it would take a ton of feed to put 250 pounds of gain on the steer and the cost would be $50. The difference of $6.50 is saved by the more efficient steer.

Suppose the feed cost was $60 a ton. At 700 pounds of feed per 100 pounds of gain the steer would have a feed cost of $52.50. At 800 pounds, the cost would be $60—a difference of $7.50. This example proves that the higher the feed cost, the more desirable it becomes to have efficient steers.

Farmers use 50 million tons of chemicals a year.

Rate of Gain:—Now let us see how differences in rates of gain of steers affect feed costs. If feed costs 2½ cents per pound, and a steer consumes 20 lbs. of feed per day, the cost of feed per steer per day is 50 cents. If the steer will gain 3 lbs. daily on the same feed, the cost of putting on

a pound of grain drops to about 17 cents. This shows the importance of having efficient steers that make a more rapid rate of gain.

Feeding Period May Vary

Although we have used a 100 day feeding period, actual time on feed varies considerably from 60, 90, 120 days and longer. A longer feeding period is necessary for 500 pound steers than 750 pound steers to allow animals to reach the desired grade. Feed, labor, and miscellaneous costs increase with the length of the feeding period.

Market Price: — Suppose we keep the same weight (1,000 pounds) used with the $2 margin, except that we change the market price. We'll use $20 per cwt. for purchase price; $22 per cwt. for sale price. Thus, the buying price for the 750 pound steer is $150; the selling price for the 1,000 pound steer $220. The difference between the two figures is $70.

This is $12.50 less than when the buying price was $25, and the selling price $27. Therefore, it is clear that a lower market price on the same margin allows less for feed, labor, etc. However, in this example, both feed and labor costs should be less. If not, then the total profit will be considerably less.

In these examples, consideration must be given to steers from performance tested sires of good type, and to the use of hormones and antibiotics and more efficient management practices. Miscellaneous costs include taxes, interest, veterinary services, death losses, etc.

In considering the above factors, it is easy to see that each has a decided influence on the cattle feeding operation. Several of these factors may combine to affect the outcome on any group of steers. One of your best tools in this modern age continues to be an old fashioned pencil. Keep accurate records and do some close figuring on expected profit or loss on your cattle operation. It will pay to know your profit or loss to help plan future operations.

Nation-Wide Farm Census Will Be Taken This Fall

Farmers will be asked to cooperate in a nation-wide farm census this fall. It will be the 17th agricultural census in which farmers and the United States government have participated. The Bureau of the Census is urging each farmer to keep a record of his harvest, farm products sold and major farm expenses so he can accurately complete his census report next fall. —*Farm & Home News*

Take The "Bunk" Out Of Bunker Silo

Here's how to do the job . . .

Condensed from Minnesota Farmer

Dennis Ryan

SHOULD you consider building a bunker silo? How does the cost of the bunker compare with that of an upright silo? Is self-feeding satisfactory or do the livestock waste too much silage? Will the silage freeze too much in a bunker? What per cent of silage will spoil if stored in a bunker? These are some of the questions farmers are asking.

I have seen bunkers that have had a low grade "manure" develop in them, which the livestock do not relish. I have also seen some clean, good smelling (if there is such a thing), high quality silage come out of a bunker. I would like to discuss some of the factors that we can control when we build and fill a bunker, that will help us preserve high quality silage to which cattle may help themselves without too much waste.

A simple definition of a bunker silo would be that it is a trench silo built above ground. All the successful operating bunker systems have the following in common:

1. Shallow depth.
2. Cross drainage.
3. Extremely well-packed silage.
4. Sloped sidewalls.
5. Almost an air-tight cover.
6. The "right" kind of self-feeding gate.

Shallow Depth

A six-foot depth is about right for self-feeding. If the depth is too great, the cattle will tramp more under their feet than they will eat. The overhang (that part that is higher than cattle can reach) will sometimes extend out over the feeding gate and eventually break off and fall under the feet of the cattle. This overhang will sometimes spoil from the underside. The operator will have to keep this part pulled down, which does not

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come under the classification of self-feeding.

If the depth is much less than six feet the percentage of top spoilage may be out of proportion to the total depth.

Cross Drainage

A bunker floor that is high in the center and slopes toward the sides will have very little bottom spoilage. The sides which are built out of two-inch tongue-and-groove material can be nailed on the posts so there is a one-inch space between the bottom plank and the floor. Any juice or rain may flow toward the sides, thru the one-inch space, and still out over the ground outside the bunker. I think it is theoretical to assume that juices or water will flow longitudinally under the silage over a long distance.

Extremely Well-Packed Silage

This is the real key to preserving silage. Air causes spoilage. Packing excludes air. High-quality packing preserves high-quality silage. Place the silage in the bunker in thin layers. Pack each layer with the wheels of an ordinary farm tractor. Run the tractor doing the packing continuously when filling the bunker. Silage that has a moisture content between 68 and 75% will pack much better than silage on the dry side.

Sloped Sidewalls

We like to have the sidewalls slope 1½ inches per foot of depth. For the six-foot depth bunker this means the sidewall would be nine inches off plumb. This slope allows the tractor wheel to run close to the wall when packing without the hub striking the wall. If the bottom width is less than the top width, the silage will snug up to the wall when settling, which will block the air from entering along the wall to cause spoilage.

Almost Air-Tight Cover

The top spoilage will be directly proportional to the amount of air that can seep down into silage from the top. Plastic covers are becoming very popular. Buy the right color so the cover won't disintegrate due to the rays of the sun. Don't buy tissue paper consistency. A low-priced cover isn't the cheapest cover. Be sure the edges fit tightly to walls to exclude air. Weight the cover down so wind won't blow it away.

If your land needs lime, you can use an inch to 1½ inches of ground limestone over the top of the bunker. As the cattle feed into the bunker you can break the limestone into pieces and toss over the side of the bunker. In the spring you can haul the lime out to the fields. Don't use too great a thickness of limestone or you may need dynamite to blast it loose. You may also use six to eight inches of chopped

straw, slough hay, or wet sawdust. All of these materials should be packed the same as the silage.

The Right Kind of Self-Feeding Gate

Any gate arrangement for feeding out of end of bunker should be suspended from a structural member that spans the bunker from sidewall to sidewall. This will sometimes prevent the loss of a man's religion if he is trying to move a sliding gate that is frozen to the bunker floor. The gate can be suspended from the structural member with pieces of chain spaced about six feet apart. The gate is easily moved forward by sliding along the top of the bunker wall. The cattle can also swing the gate toward silage which allows them to get at more silage from one setting of the gate.

The type of openings in the gate proper will determine how much silage the cattle will waste. A series of V-type openings seem to work the best. The bottom of the "V" is about 20 inches from the bunker floor. An animal will stick its head through the opening and lower it to eat. If it pulls its head straight back with silage in his mouth, the ears will get nipped by the sides of the V. The animal soon learns to put its head through the V and keep it on the inside until through eating.

You can also make a half a V by sloping the usual vertical boards, all the same direction, at an angle of two to one. That means for every two feet in height the boards are sloped one foot off plumb.

Wild onions in alfalfa can be controlled by good management practices. There is no chemical recommended. Alfalfa is susceptible to 2,4-D which is recommended to control wild onion in some other crops.

Virginia Polytechnic Institute.

An electric wire on an electrified pipe have been used with good results. This type of control is usually placed fairly low to make cattle practically eat off the floor.

I notice I haven't answered some of the questions mentioned at the beginning of this article in regard to cost, freezing, and amount of spoilage.

A bunker that costs the same as an upright silo will hold about 2½ times as much silage as the upright.

Most of the freezing occurs on the top. Just before cold weather sets in, place about three tiers of baled hay or straw on the top of the bunker and use them as the cattle eat their way along the bunker.

First Aid For The Cow

From England, a report on the prevention and cure of udder troubles, bloat, other ills . . .

Condensed from Farmer and Stock Breeder

R. H. Holmes

WHEN owners discuss their herds they seem shyly reluctant to admit that their cows are ever ill.

The figures for wastage from our dairy herds tell a different story, and it is wise to confess that however careful our management, our animals are subject to risk of illness. But a great deal of consequential loss can be avoided by sound routine and prompt treatment. This is particularly so in the case of that scourge—mastitis.

In "theory" everyone uses a fore-milk or strip cup to draw a little milk from each quarter of every cow before each milking. In practice it may be difficult to achieve but it should be done fairly frequently to see if the telltale clots of mastitis are showing.

In any event, the filter pad in the milk filter, through which all milk should pass before cooling in the dairy, should be examined carefully after each milking. There should be no real dirt if clean milk production is really practiced and a few clots may show up here before they are detected by testing an individual cow.

Find the Cow

At the first sign, a thorough check must be made until the cow and its quarter causing the trouble have been located. It should then be milked last and the unit immediately sterilized. If the cow responsible still cannot be identified, your veterinarian can arrange for laboratory tests to be made on individual cows' milk until the germ is located.

I do not propose to discuss the treatment of mastitis, which should always be carried out in consultation with your veterinarian.

But do remember that haphazard poking about with tubes of antibiotics is a fine way of breeding resistant strains of germs.

On the other hand, in well-managed herds, mastitis is a

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rarity and when it occurs it will nearly always respond to a correct course of modern drugs. Prevention is, of course, better than cure and it is in this sphere I find the peace of the cowshed has advantages over the parlor.

Careful examination of the udder before milking will reveal any small cuts and chaps that have developed. Dust with boracic powder before milking and apply a modern udder salve afterwards. The trouble should quickly disappear. In some cases, skin eruptions on the teats tend to spread and these can usually be checked by the application of an iodine ointment immediately after milking.

Inevitably, animals will come in on occasions with fairly deep cuts that they have accidentally acquired. These can prove dangerous anywhere on the body if neglected. The best treatment I have found is to blow sulphanilamide powder into them from a powder blower once or twice a day until the wound heals. Keep an eye on them for a few days afterwards to make sure there is no swelling or redness developing in the neighborhood of the wound.

Should this happen or the animal's temperature rise, call your vet at once.

Bruising of the bag can occur even from the blow of a dehorned head. Pressure from the swelling causes the damage and prompt treatment to reduce inflammation is required. Where the skin is unbroken, painting with tincture of arnica is effective. Bathing the affected part with a hot solution of Epsom-salt in water is also useful.

The size of a man can be determined by the size of the things that upset him.

If there is internal bleeding, giving blood in the milk, healing is speeded up if the quarter concerned is only partially milked for one or two milkings.

Attention to hedges can often prevent accidents to cows, but when it is tormented by flies an animal may break anywhere. Many of us feel very strongly about the continuing trouble with warble fly. If everyone obeyed their legal obligation, and dressed the swellings caused by warble fly larvae on their cows' backs this infuriating pest could soon be wiped out.

Mad from Warbles

Instead, having killed off our own stock of warbles, we find our cows driven nearly mad when the flies hatch in the spring from grubs dropped from the backs of neighbors' cattle.

One of the rules of successful milk production is to refuse to accept as normal any sudden

drop in milk yield by any cow. There must be a reason, and it must be identified without delay.

A fairly common cause is a sudden chill. The animals will look listless but may, or may not, continue to eat their food.

Before calling in the vet as much information as possible should be collected.

Count the animal's respirations (breathing rate). In good health a cow will normally breathe 18 times per minute. I must say, however, that an old cow of mine confounded us all by breathing at double this rate for about a year, for no apparent reason. The pulse should next be taken, although this is not quite so easy. The artery under the tail is perhaps the best place to put one's finger (not a thumb where one's own pulse can be felt) to feel the rate of pulse beat, which in health is about 60 per minute.

To Take Temperatures

Every farmer should have a clinical thermometer. The mercury has to be shaken down into the bulb before lightly greasing the stub end. Then, holding the cow's tail with one hand, slide the thermometer gently into the animal's rectum. After it has been there for at least a minute it is wiped clean with cotton wool before reading the temperature. In health this is between 100½ and 101½ degrees.

Anyone with this information can now give his veterinary surgeon a good idea of the trouble in a chat over the telephone. Many vets allow their clients to keep a stock of sulphanilamide powder. They can then prescribe the requisite dose to bring the temperature down, even if other calls delay them reaching the sick animal.

Particularly with high-yielding cows, there often comes a time some weeks after calving when they lose their appetite and start picking at their food. Frequently this seems to be liver trouble. There are some excellent Vitamin B^{12} injections available to veterinary surgeons that will generally put this trouble right in 48 hours.

Scourge of Acetonemia

In some cases the strain of high production results in acetonemia. Concentrates are refused, but oats and good hay are generally relished. Milk yield drops as insufficient protein is eaten. The acetone smell of the cow's breath from which the complaint gets its name is not always present, and animals vary in their response to various treatments.

The worst case I had was a cow quite prepared to go on increasing her milk yield so long as her concentrates were increased. After trial and error, I found that by feeding her at the

beginning of her lactations, so that she kept below her possible peak yield, and keeping her well supplied with starchy foods, she avoided trouble. Later in her lactation I was more generous, and for several years she exceeded 1,100 gallons.

In her case, and in one or two others, I found feeds with their quickly available sugar invaluable in warding off acetonemia. Now, every one of my cows gets a basic ration of beet pulp throughout the winter.

Once an animal is badly affected with acetonemia, the aim must be to restore appetite as soon as possible. Strangely enough, poultry food will often be eaten when normal cattle feed is refused.

It may be that these hen foods have a higher Vitamin B content.

Of drenches, glycerine is the most generally useful, mixed with equal parts of water. But I strongly advise you to add a trace of some strong flavored substance such as molasses. Glycerine is tasteless, and cases have occurred where cows have got it in their lungs through not realizing they had anything in their mouths.

The Way to Drench

I do not propose insulting some fellow farmers by telling them how to deal with cases of indigestion, but I do think something must be said about drenching.

A really strong bottle should be used and if possible the cow's head should be supported by a halter with its rope slung overhead in such a way that the beast's head lies almost horizontal. Then, with the nose held with one hand, the bottle can be inserted in the side of the animal's mouth.

This is another job to be done slowly, however difficult it may be. The drench should be dribbled in, a little at a time, if a sometimes fatal choking is to be avoided.

It has been estimated that 500 hens will produce about one ton of manure per month.

Bloat is something most dairy farmers fear. Some farmers are notorious for this trouble, and their occupiers become experts on the problem, but to most of us it comes as a sudden emergency. Perhaps most often it strikes in late spring in warm, moist weather when the herd is grazing a clovery pasture. Some animals in the herd will prove more susceptible than the others.

However lucky one has been in the past, it is always wise to be prepared for bloat in late spring and keep the cows under frequent observation.

Typically, the affected animal begins to swell up with the pressure of an internal build-up of gas.

Suffocation

If it remains unchecked, the swelling increases until, when the pin bones seem to disappear into the outline of the animal's body, death by suffocation is very near. Treatment aims at helping the animal to break this mass of wind.

Oil drenches are useful, and linseed oil is perhaps the most convenient form to store and administer. Another useful tip is to put a wooden bit in the animal's mouth and induce chewing, which sometimes breaks the wind.

Until the animal is back to normal it should be kept walking, by driving it around a yard.

Why in the world should a person want to steal another's thunder when anyone can make noise?

Finally, one should be equipped with a trochar. With this dagger one can pierce through to the cow's intestine and release the gas. It is definitely a last-ditch measure, but it is vital to get your vet to show you how to do the job properly should the emergency arise. It will be too late when a cow is near death.

Tractors and Mud

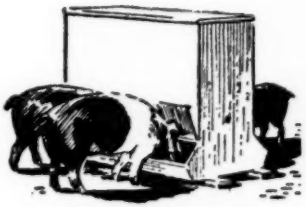
Mud presents an additional hazard for tractor operators. Not only is time lost trying to compensate for muddy conditions, but many serious accidents occur when a tractor is stuck in mud bog.

When a tractor is stuck, there is one principle the operator must recognize: If the wheels cannot move, something must turn when power is applied. The result is that the chassis will revolve around the axle and crush the operator. Many farmers find that traction is gained when extra weight is added by changing the position of the draw bar. Oftentimes, the weight applied is enough to prevent the wheels from moving at all. When the center of gravity is changed by this practice, the front end of the tractor will flip over backward.

Any time the wheels slip, this is a warning sign to the tractor operator spelling DANGER. The National Safety Council says that the best thing to do when a tractor is stuck is simply to get off the tractor and find help to pull it out. This is the safest and surest way.

—West Virginia Extension News

More Lean Pork



We must produce the pork they want.

Condensed from Breeder's Gazette

Clayton A. Hubbs

THE housewife has become persistent in her demand for lean pork at the meat counter. We must not only produce meat type hogs, but sell them at lighter weight.

The present corn-hog ratio may make it profitable for the hog producer to feed out to heavier weights — around 230 pounds. But this is a short run situation. Hog producers who plan to stay in business for awhile are also interested in what kind of market they'll have next year. As the housewife becomes more particular the buyer will become more particular. We are already beginning to see the effects of this.

A study was recently conducted at the University of Missouri to investigate the increase of fat, lean and bone and changes in carcass measurements as hogs were slaughtered at heavier weights. The hogs were slaughtered at 50, 100, 150, 250 and 300 pounds live weight. Twelve hogs were slaughtered in each of the six groups. All hogs were closely related and were exceptionally good meat-type hogs. What the researchers learned should prove to be an eye opener to anyone who maintains that heavy hogs are best for slaughter.

For the purpose of comparison let's consider the carcasses of 150 and 250-pound hogs and see how much meat was gained by putting on that extra 100 pounds of finish. One thing to keep in mind before we start: The hogs in the 250-pound group were extreme exceptions. They were far superior to any of the other groups in the test. Even at this 250-pound weight, they would have graded U.S. No. 1. The average loin eye for this group was 5.18 inches as compared to 4.21 for the 200-pound group and 4.8 for the 300-pound group. The fact that these hogs were exceptional adds even greater

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significance to the following comparison.

While the hogs were putting on the extra 100 pounds, carcass trim fat increased 138 per cent. Dressing percentage increased only 2 per cent and the total weight of the lean cuts increased 162 per cent.

Fully 46 per cent of this increase within the lean portions was *fat*. Fat that couldn't be trimmed off. This is the fat the housewife finds out about when much of her nice big ham shrinks away in cooking.

The ham is considered to be the representative cut in a hog. By analyzing the ham, a meat processor can give an accurate description of the rest of the carcass. There was twice as much fat in the hams of the 250-pound hogs than the 150-pound hogs.

Carcass trim fat—leaf fat, backfat, plate and other trimmings—increased in weight 17.6 times or approximately three times faster than live weight from 50 to 300 pounds. Meanwhile, the weight of the four lean cuts, which include the ham, loin, Boston Butt and picnic increased only five times.

Carcass length increased approximately two inches and backfat thickness increased about .3 inch per 50 pound increase in live weight.

Dr. Steve Zobrisky, assistant professor of animal husbandry at Missouri, summed up the study when he said, "As these hogs increased in live weight, the weight increase of the fatty tissues of the carcass increased at an accelerated rate, whereas the lean and bone tissues increased at a progressively slower rate. Therefore, the per cent of fat increased while the per cent of lean decreased during growth and fattening."

A few points to keep in mind when buying a farm. (1) Purchase a large enough unit for a profitable business rather than a hobby farm unless you have other income. (2) Look more at the soil and tillable acres and less at residence, view, and setting. (3) It usually is more advantageous tax-wise to buy a farm in need of repair than a high priced farm in tip-top shape. —Farm Facts.

Based on data compiled in 1910, the optimum weight at which to sell a hog for slaughter is 220-30 pounds. But this is 1959. Has no progress been made in swine feeding since 1910?

Feed efficiency was not a part of the test—only carcass evaluation. It is generally agreed that after a hog reaches, say 200 pounds, the feed conversion rate becomes steadily poorer.

Those who argue for heavier hogs say that light hogs are not flavorful. This just isn't true. Countries that have experimented with pork for centuries sell hogs at 150 pounds or lighter. These consumers have become spoiled. They're buying lean meat instead of fat.

"If you are planting for a year, plant grain; If you are planting for ten years, plant trees; If you are planting for a hundred years, plant men."

—Chinese proverb.

We're not advocating the marketing of 150-pound hogs. Marketing revolutions don't happen overnight. Number 1's at 190 pounds or less seems like a good goal to shoot for. Feeding hogs out to 230-40 pounds now because of the favorable price of corn just doesn't look like good business over the long run. In the first place, the market will be flooded with more pounds of pork. This is bound to have a depressing influence on prices. In the second place, the market will be flooded with more pounds of fat. The housewife will buy much of this fat in the form of "inside" fat that can't be trimmed. She will be disappointed. She will buy less pork.

A decrease of one pound per capita in pork consumption is equal to 1½ million fewer hogs consumed that year or an equivalent decrease in price. So far we as a nation have been accepting the price cut.

Following market trends without looking to the future is a practice that is sure to put a lot of hog producers out of business and make it tough on those who stay in.

Consumer studies show that the pork industry is becoming "leaner" because of its "fatness."

Fertilizer For Fruit Trees Vital, But Slow in Effect

Fertilizer's effect on fruit trees may take anywhere from 2 to 5 years to show up, according to C. Marshall Ritter, Pennsylvania State University. Ritter said nitrogen may take 2 to 3 years to be reflected in a fruit crop and the full effect of potassium may not be realized for 3 to 5 years. As for phosphorus problems, which normally take years to change, "Your son may correct them" he states. —*Pennsylvania State University*

Don't Be Afraid Of Integration

Changes are not necessarily bad . . .

Condensed from Better Farming Methods

From a talk by *Earl L. Butz,* Dean of Agriculture, Purdue University

AGRICULTURE is changing from a way of living to a way of making a living . . . From a business of arts and crafts to a business of science and technology.

The industrial revolution of the past half century by-passed much of agriculture leaving its organization around the relatively small family-type unit. Many of these individual units — perhaps more than half of them — are so small or so inefficient as not to yield their operators a living standard generally regarded as adequate.

The present agricultural revolution, resting on basic science and closely allied with the widespread advance of automation in both production and distribution, is threatening this traditional pattern.

Because *vertical integration* is one of the stage properties being used by science, by technology, and by automation, places it under political suspicion as the villian in the act.

Here are five fundamental characteristics of current agricultural adjustment which bear on the problem:

1. Capital requirements have increased to the extent that it is difficult for an individual to accumulate sufficient capital to finance an economically-sized operating unit. This will become increasingly true in the decades ahead.

2. Management has become the key factor in successful farm operation. This is in sharp contrast to a generation or two ago . . . when many fewer critical managerial decisions had to be made.

3. The trend toward larger and fewer commercial farm units will continue. This trend has been pronounced during the past decade. It will accelerate in the decade ahead.

4. The commercial farm will assume characteristics of a manufacturing plant with the manager assembling "packages of technology," produced by others

Reprinted by permission from Better Farming Methods, Mount Morris, Illinois

on a custom basis. The share of total farm receipts spent for production items will increase still further, the gross margin per dollar of receipts will became narrower, and profits will depend more and more on growing volume.

The average farm accident costs 10 days' work loss and $105 in medical expenses.

5. The process of "Rurbanization" will accelerate. Rural and urban cultures will intermingle. A new community culture will emerge in which the farmer will tend to lose his vocational identity, just as the lawyer, the doctor, or the machinist now loses vocational identity in his own community.

Thus, we have the five basic trends brought on by integration in agriculture. Now let's look specifically at the social implications of the agricultural revolution. They may be grouped under four general headings:

● Growing pressure on the combination of owner-manager-operator in one man.

We have departed from this pattern in the majority of other major business sectors of America. Time was we had many family foundry shops, bootmakers, corner grocery stores, and yes, even automobile assembly plants. These have given way to larger units, with more capital, with higher levels of management, with more specialization of labor, and, if you choose, with a higher degree of integration.

In the main, when such changes have occurred, opportunities for profit and for higher living have increased for owners, for managers, and for workers. Some individuals were injured in the adjustment, but on the whole, society gained.

The point is that economic pressures in agriculture make the field ripe for integration to manifest itself. But the critic of the change will often mistake the process of integration as the cause of the change.

● Our system of fee simple ownership by individual operators will be under increasing pressure.

The typical cycle of farm ownership and operation under our present system of fee simple ownership by individuals is essentially the life cycle of an individual. In the main, our farms need to be refinanced each generation.

With the process of refinancing, usually comes a disruption of the farm as a going concern.

Industry has avoided this disruption by having divisible shares of ownership. This permits passing ownership from one generation to the next without disrupting management or operation.

The pressure is in this direction in commercial agriculture. However, this does not necessarily mean the growth of corporate farms. This may be accomplished in a number of ways:

● We shall see the growth of family shares of ownership of the family farm, instead of placing the farm in an estate to be sold as a unit.

● Another way of meeting this problem is single operation of multiple tract ownership. The operator may be either a part owner or a complete tenant. In either event, he shares with others part of the traditional owner - manager - operator function. He surrenders certain freedoms and privileges in the process, but he gains greater rewards in return.

● Negotiated pricing will tend to displace the present competitive price-making structure.

This has already taken place in the case of fruits and vegetables grown under contract for specialized processing, broilers produced under contract, and some feeding contracts for large animals. We shall see the development of price bargaining agencies among producers, who will attempt to bargain growing terms and prices before the crop is planted, the eggs put in the incubator, or the livestock bred.

● Distribution patterns will change markedly.

Under the kind of price bargaining outlined above, existing marketing institutions will be under pressure. They will be bypassed by increasing quantities of products as they flow from farm to consumer.

Condensed milk was first produced in 1851, dried milk patented in 1872, malted milk developed in 1883, and pasteurized milk made its first appearance in 1895.

Local auction markets will be under pressure. Jobbers, wholesalers, and even retailers may find it difficult to get enough volume to maintain themselves.

Political Implications of Integration

The political implications of vertical integration may be classed under five general headings.

● Fewer farmers inevitably means decreased political power for agriculture.

Indeed, that trend has been apparent in recent years, as farm politicians have faced increasing difficulty in holding the Farm Bloc together in Congress.

As commercial agriculture moves away from a "way of life" and becomes more business-like, and becomes more closely integrated with processing and distribution functions, it is inevitable that the relative political power

of agriculture will decline. Even so, farmers will continue to exert political influence out of proportion to their numerical strength.

An ad in a Kashmir, India paper advertises — "5 room house boat, 3 cooks and a maid, fully furnished, $65.00 per month."

● Political leaders will resist vertical integration in agriculture.

The philosophy of the small, owner-operated family farm is deeply ingrained in our sociological and political customs. Political pressure will continue to be to maintain small family farms, even though modern technology dictates that family farms become larger.

There is no prospect that ambitious politicians in Congress will stop demagoging the emotionally explosive family farm issue any time in the foreseeable future.

● Governmental aid will become available for producers to organize bargaining units to deal with processors on matters affecting price and production arrangements.

In some states the Agricultural Extension Service will likewise develop aids and guides for producers who want to form some bargaining units.

Sometimes initiators of vertical integration will feel that such aid to producing groups constitutes an unwarranted interference with the price-making structure.

● There will be an increase in the amount of regulation over our entire marketing structure.

Increased regulation will be distributed throughout the entire market structure. Some of it will be done by producer groups, some by processor and distributor groups, and much of it by state and federal governments.

The trend will be in the direction of administered prices, determined either through negotiation or by quasi-public regulatory bodies, rather than by direct competition in the market place.

As production of a commodity moves into fewer hands, and the commodity moves toward integration from producer through processor and distributor, increasing pressures will develop to extend the use of marketing orders.

Clean all surface dirt from sows before farrowing.

● There will be growing governmental discrimination against the larger processors and marketing agencies who attempt to initiate integrated arrangements.

This will place large commercial concerns at a competitive disadvantage *vis-a-vis* the smaller and medium sized concerns. The larger concerns which attempt

integration, especially under direct arrangements with producers, will face continuing harassing action from the Federal Trade Commission, the Department of Justice, and Congress itself.

Changes Not Necessarily Bad

Many agricultural and political leaders are frightened by the growing vertical integration in agriculture. They should not be any more wary of this change than of other economic and sociological changes occurring in modern society.

Change is the law of progress. The challenge which faces us is to direct the change along constructive and beneficial channels.

There is much good in integration. With proper direction, it will result in increased production and distribution efficiency, added control of quality, a more even flow of product seasonally and geographically, less risk of price and income variation to the producer, more rapid adaptation to scientific and technological innovations, and increased incomes to many producers.

The fact that an individual producer may surrender some of his managerial freedom and may transfer part of his risk-taking to someone else is really a very small price to pay for the advantages that flow out of an integrated system.

It is clear that the forces of politics and the forces of economics are and will continue to be on opposite sides of the vertical integration question. In this engagement, politics will fight a delaying action. They will neither stop nor reverse the economic trend. In the final analysis, the economic forces working in this process will be overwhelming.

Only 40 per cent of the nation's hogs are vaccinated for cholera.

None of us would want to live under the economic conditions which prevailed 20 years ago. Yet we v i g o r o u s l y resisted changes which were then occurring in the patterns of production, processing, and distribution. As we look back now, we wonder why.

Likewise, 20 years from now, we'll look back on 1959 and be a little amused that we were so fearful of change, rather than directing our energies toward channeling change down beneficial pathways.

It has been said that the proponents of the "status quo" are often the villains of history.

Those who resist inevitable change frequently perish in the process.

The future belongs to those who prepare for it.

Every Acre In The Silo!

Watch this trend toward volume without adding to acreage . . .

Condensed from Capper's Farmer

Norman Reeder

LAST year, Paul Way and Ralph Baird put every last acre of their cropland into corn for silage. They harvested 16 tons to the acre, a total of 2,800 tons. The crop filled five silos —a new 30 by 60, two 20 by 60's, a 14 by 40, and a 12 by 40.

With this mass of corn silage, plus only protein supplement and very little hay, they feed 400 to 500 head of cattle on their 325-acre farm in Eaton county, Michigan.

Is this the kind of cropping program we are going to see on a lot of livestock farms in the future?

Way and Baird think it is. These men are in the silo business. They went into beef feeding on a virtually all-silage basis because they saw their customers moving very fast in this direction. It looked profitable.

Why not try it for themselves —go the limit with silage—make it a pilot operation on the farm Paul Way owned with the records open for customers to study? Men considering more silos wanted to know how far they could go toward an all-silage program. How fast could they expect their investment to pay off?

Now in their second year of operation, Way and Baird are pointing to solid profits from this new way of farming. They are feeding out mostly plain cattle to high-good to low-choice grade—some to choice—at a feed cost of 13.5 cents a pound. Gains are averaging 2 pounds a day.

Cattle are full-fed silage right from the start, along with 2 pounds of 44-per cent supplement containing urea, and whatever hay cattle will eat at the racks in the yard.

Hay consumption is under 2 pounds per head per day. So this purchased item accounts for less than a half cent of the feed

Reprinted by permission from Capper's Farmer, Topeka, Kansas

cost for a pound of beef.

Labor cost is the least of their worries. The job of feeding 500 head of cattle and cleaning up the yard is reduced to one-man size. It is all mechanized. Silo unloaders throw feed down into an auger system that serves the entire yard.

As silage flows toward the yard, supplement is metered into the stream at just the right rate to supply 2 pounds for each animal.

They do need extra help at planting and at harvest. Last spring they had two rigs plowing while Way followed up with the corn planter. They have been using light tillage, but this year they plan to put in corn right on the furrow. When they filled silo, they had three choppers on the job.

They figure their level Miami and Conover loams can produce an average of 15 tons of corn silage to the acre year after year. That's with a good fertilizer program plus manure from their yards.

Plow-down fertilizer for the crop is 350 pounds to the acre. It's a blend of 300 pounds urea nitrogen (45-0-0) to 100 pounds triple superphosphate (0-46-0), and 100 pounds muriate of potash (0-0-60). Then they use 200 pounds of 6-24-12 in the row at planting time.

So far they aren't worried about soil insects with today's hard-hitting c h e m i c a l s. The same goes for corn borers.

One of the biggest highway problems now is all the old model drivers in the new-model cars.

Corn is the logical crop for silage, if you can grow it, Way points out. Few, if any, other crops can touch it for yield. And it's easy to make good corn silage. The crop is at its peak feeding value when tonnage per acre is highest. Corn harvested for silage yields right around 50 per cent more nutrients to the acre than you can get from the same acre harvested as grain.

Another consideration that argues for corn silage in a beef-feeding operation is its modest cost of storage. Silo costs have not jumped as much as costs of most other farm materials and services. And the bigger the silo the lower the cost of storage.

Dairy farmers, too, are taking long strides toward all-out cropping for silage. But it's not so easily done as on a beef-feeding farm. Dairy cows still seem to need some good hay to keep dry matter intake high. Nutritionists tell us adding some grain to the roughage ration looks like the cheapest way to meet the ener-

gy requirements of high-producing cows.

However, there are those who tell you cows will eat enough good corn silage to meet all their requirements except for protein and essential minerals. Some of the high-producing herds in the Midwest are now on such a feeding program, using a supplement specially designed to balance roughage.

Fall Hog Prices Expected to Hold Above 1955

A University of Illinois agricultural economist expects hog prices to hold up much better this fall than they did in 1955. Speaking before the annual Illinois Swine Growers Day, L. H. Simerl gave these reasons why he expects the better prices.

The supply of pork per person may be no greater, and probably will be less, than it was in 1955. Farmers have reported that they plan to produce about 2 per cent more pigs this spring than they did four years ago. But the population has climbed 7 per cent since that time.

Consumers are accustomed to eating much more pork than they ate in 1955. Right now, Simerl pointed out, packers, retailers and consumers are working through the 1958 fall pig crop. This crop is about 25 per cent greater than was being slaughtered, retailed and consumed at this time four years ago.

In strong contrast, the probable market supply of hogs this fall will be no more than 5 per cent greater than it was four years ago. The supply per person, however, may be no greater, and possibly will be a little less, than in 1955.

The competitive supply of beef is also more favorable to the hog market this year. The beef supply increased 20 per cent from July 1955 to February 1956. No such increase is in prospect for next fall. Only a severe and widespread drouth would force such a big increase as 20 per cent on the market in the next 12 months.

Looking to the 1959 fall pig crop, Simerl told swine growers to expect a larger number than that of the past fall. He pointed out that the expanding phase of the hog cycle usually runs for more than one year. Recently the hog-corn price ratio has been favorable at around 14. It will probably remain favorable during the next three months when farmers breed for fall pigs. There is also a wide abundance of feed grains that favors increased hog production.

—University of Illinois

71% Of His Calves Come In 3 Weeks

Artificial breeding pays big for this cowman . .

Condensed from Farm Journal

Ray F. Anderson

FOR years I've listened to beef cattle "experts" lean back in their swivel chairs and pontificate on the great improvements that artificial insemination could bring to the beef industry.

Up until a couple of years ago, I saw little chance for artificial insemination to catch on — at least not in the range country. I'd seen the idea flop too many times.

But I've changed my mind. I'm willing to predict that *artificial insemination of beef cattle is going to grow plenty in the next ten years.* I'm told that 25% of all dairy cows are now bred by A.I. By 1975 I can see that the beef total might be that high.

What makes me thing so? Simply talking with cattlemen who have learned—most of them the hard way—how to make a real go of it. Clayton Jennings is one. He runs Jennings Brothers 1,000-cow Hyland Angus Ranch in Hyde County, S. D. These are some of the reasons Jennings likes A.I.:

Tighter Calf Crop

More than 700 calves—71% of the total calf crop—last spring hit the ground within three weeks. That's an average of 33 a day.

Better Prices

This goes for both feeders and breeding stock. "The margin over going prices is getting wider every year," says Jennings. "You can see the possibilities of improving uniformity and quality when we need two or three bulls to artificially breed the entire herd. Naturally, we use only our very best ones."

Bull-Cost Savings

"Our figures show that it costs us $3.25 per cow for bulls used artificially against $8.75 per cow for the same kind of bulls used naturally," Jennings tells me.

Reprinted by permission from Farm Journal, Philadelphia 5, Pennsylvania

That's an annual saving of $5,500 on this ranch.

But don't let anyone tell you that breeding a range herd by AI is easy. Every detail of the job must be taken care of at just the right moment.

Cowboys can make or break a successful range AI program.

"Our men *know cows,* and most of them have been spotting for four years," explains Jennings. "They can tell when a cow or heifer is bullin' the second they see her. They're interested, too. It's not unusual for one of them to sit a saddle as much as 35 miles a day while spotting."

That's not all there is to it, of course. You need a skilled technician, adequate handling facilities and all-around good planning. But if your riders don't have the know-how to bring females to headquarters pronto, you're out of luck with test-tube breeding.

Jennings sets up a microphone and other laboratory equipment in one of his bunkhouses for his technician, Rand VanDervoort, to use. VanDervoort checks all semen thoroughly at collection time and the diluted product twice a day during the breeding period.

My mind kept coming back to those 700 calves in 21 days as I talked with Jennings.

"How do you do it?" I asked.

"Besides the good riders and a technician who knows his business, we inseminate the cows *twice in 24 hours*—before they go out of heat. This boosts conception rate 5% to 10%.

"A tight calf crop like that ought to be money in the bank," I commented.

Know your grower before switching to a started pellet program.

"It certainly is," conceded Jennings. "It meant at least $4,000 more to us in 1958 than we would have made if calving had been strung out like it used to be.

"And that's probably figuring low," the cattleman added. "We know from experience that we're out a $20 bill on every commercial calf dropped a month late, and $60 to $100 each on the late-calved purebreds."

Add the $4,000 (or more) gain from shortening the calving season plus the $5,500 saving in annual bull costs for breeding 1,000 cows and you can see why Jennings is "pretty high" on AI.

"Much more work for you fellows?" I asked as I turned to Ernest Suhn, foreman of the commercial herd.

"Yea-h, it takes a lot of work and horses," Suhn drawled, "but it's sure the way to do it. At

first we wondered what the Hades we'd do for calves if this inseminating business didn't work. But we needn't have worried.

"Take a peek at that bunch of black beauties," he exclaimed, pointing to a carload of calves in a nearby corral. "One just like another. They sure weren't that uniform when we were turning bulls out."

Dairy records aid in culling, breeding, and feeding.

As I talked to Foreman Suhn, I couldn't help but think of a quite different cowboy attitude in Arizona.

In 1940, Indian Affairs officials tried to use AI to speed up improvement of a 900-cow Hereford herd on the White Mountain Apache Reservations.

It got started in 1941, but nine years later it folded, and the herd was returned to pasture breeding.

What washed it up. Indifference of the cowboys, both Indian and "paleface."

"We didn't shorten the calving period," reports M. D. (Dutch) Linn, reservation livestock manager, "but we sure did improve our herd quality.

"In our feeder auctions last fall, 53 head of steer calves, averaging 404.5 pounds, hit $37.75, and 54 head of 389-pound heifer calves brought $35.70. The entire 4,000 head sold well because of the quality we got from nine years of using superior bulls artificially."

It's easier every year to find reports on successful use of artificial insemination with range herds. Tobin Armstrong, Kenedy County, Tex., has used AI for a half dozen years; this year is "going all the way" on a 1,000-cow herd with a show-champion bull that averaged 3.7 pounds a day in a rate-of-gain test.

Dale Engler, manager of Ramsey Ranch, Butler County, Kan., has been adding quality and weight to his commercial Angus calf crop by AI. So has John B. Minor, with his 1,000-cow Hereford herd in Saskatchewan, Canada.

These top cowmen all give much of the credit to riders who are skilled in heat detection. They provide lush holding pastures, and they all use their best bulls—best by any standard you wish.

There's plenty of activity on beef insemination going on all-around the country—and outside it, for that matter. I'm told that close to a half million beef cows were bred artificially in Great Britain last year.

Nearly every major bull stud in the Midwest now carries semen from production-tested beef

bulls. Part of it, of course, is used on dairy cows.

The big and far-flung American Breeders Service with dairy studs at Carmel, Ind.; Madison, Wis.; and Palo Alto, Calif. providing more than 100,000 services a month, is now producing beef-bull semen for range herds.

A new development, and a growing practice, is "custom collection" of beef-bull semen to freeze and store until the cowman has need for it. It appeals especially to purebred people with herds on the show circuit at breeding time and to owners of partnership bulls. A few owners of excellent aged, or bunged-up, bulls are also using it.

Probably the most ambitious range breeding program is that of the Armour Beef Cattle Improvement Research group in Denver, Colo. This organization contracts all over the United States, furnishes semen for free (other than for labor and equipment involved) on written agreement that Armour will have first chance to buy the steer calves for market price at weaning time.

Armour will check the feed efficiency of these calves during the feedlot period and collect various ratings to determine their carcass quality.

Veterinarian Harold J. Hill, director of the Armour Research project, anticipates the day when startling results will come from artificial breeding plus use of hormones and drugs. He suggests:

- Bringing large numbers of female animals (perhaps even the entire herd) into heat simultaneously.
- Transferring, from one dam to another, ova fertilized with selected semen.
- Predetermining sex.

The road to success seems to be paved with needles in haystacks.

Sound kinda wild to you? They do to me, too, but I'll be the last one to say they won't be done.

If you decide to give AI a try —and I hope maybe we've got you fired up a little by now— let's go over some of the things that successful artificial insemination users have learned, many of 'em the hard way:

- Test the semen before using any of it.
- Bring the cows to good holding pastures near the breeding site. Let 'em alone until they get used to it. Have 'em happy, not spooky, when ready to breed.
- Have heat-spotters who know their business and are willing to work.
- Have handy equipment, everything clicking, smooth as clock-

work.

- Breed as many cows as possible twice during one heat period.
- Use an experienced inseminator, who also is a good planner, a technician.
- Keep the bred cows under observation until sure they aren't going to come in heat again.
- Turn clean-up bulls on the range with the cows.

Artificial breeding of range cows isn't an easy job, but it can be done if you go at it right.

Good luck!

New Weed Control Chemicals in Legumes

Three new weed control chemicals for legume crops, 2,4-DB, dalapon and EPTC, were discussed recently by K. P. Buchholtz before the Illinois Custom Spray Operators' Training School in Urbana. Buchholtz, a University of Wisconsin plant pathologist, said that these chemicals are necessary for weed control in forage crops, as tillage cannot be used.

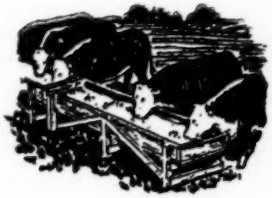
1. 2,4-DB is similar to 2,4-D. But most forage legumes are more tolerant of 2,4-DB than of 2,4-D. As a result, 2,4-DB will control many broad-leaved weeds in stands of alfalfa, birdsfoot trefoil, red clover, alsike clover and ladino clover. Because 2,4-DB is not so effective as 2,4-D on mature weeds, it should be applied early in the season when weeds are small.

At the present time this new chemical can be used only on forages grown for seed. Until a label recommending its use on forage legumes is prepared, it cannot be used on these crops.

2. *Dalapon,* reported Buchholtz, has possibilities for controlling grassy weeds in alfalfa, sweet clover and birdsfoot trefoil. But because this chemical leaves a significant residue when applied to established forage, its chances for becoming recommended are slim. There is a possibility, however, that it may eventually be used on seeding legumes, as residues will seldom persist into forage harvest if the material is applied in the seedling stage.

3. *EPTC* is applied as a soil treatment, according to Buchholtz. Since it must be incorporated into the soil surface, it is applied as a pre-planting treatment. Applications of 3 pounds per acre have usually given excellent control of annual grassy weeds and fair to good control of broad-leaved weeds. However, seedlings of forage grasses cannot be established in areas treated with EPTC. *—Illinois Agricultural Extension Service*

Pellets For Profit In Feeding Beef Calves



The latest research from Illinois on pellets.

Condensed from Illinois Research

A. L. Neumann,
J. Webb and *G. F. Cmarik*

PELLETING hay, or compressing it into small, high-density particles, offers many possibilities for the cattle feeder. Some of the advantages, such as the following, are obvious:

1. Pellets are ideally suited to mechanical feeding or self-feeding.
2. Storage space requirements are reduced by about three-fourths.
3. Wastage of the leaves, which are the most valuable part of the plant, is greatly reduced.
4. Cattle cannot sort out the more palatable portion of the hay.
5. Hay pellets can be more easily and more accurately mixed with the concentrate portion of the ration.

This list alone makes a good case for pelleting hay. However, the possibility of other important advantages was suggested to us by previous work at Illinois and elsewhere with pellets containing all the components of a cattle ration. As a result, we recently conducted two experiments with pelleted hay at the Dixon Springs Experiment Station, which is located near Robbs, in southern Illinois.

Alfalfa-Timothy Used in Trial I

Thirty 425-pound steers were placed in three lots and fed either long (baled), chopped, or pelleted hay according to appetite for 119 days. All calves had access to salt and a complete mineral mix.

The hay was a mixture of about two-thirds timothy and one-third alfalfa, all cut and baled at the same time from the same field. It was considered average in quality as far as stage of maturity, color, leaf content, and freedom from foreign matter were concerned. Just before the test, some of the hay was chopped into 4- to 6-inch lengths with a forage chopper. Another portion was finely ground with

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a hammermill and pelleted by extruding it through a 3/16-inch die.

From the start of the test it was obvious that the calves preferred the pellets to the long or chopped hay. Calves fed pelleted hay ate about one-third more hay during the test than did the calves on long or chopped hay.

This great increase in feed consumption resulted in a dramatically improved performance. Daily gains were nearly tripled, and costs of gain were reduced by about $4 a hundred-weight. Each ton of pelleted hay produced about 100 pounds more gain than the long or chopped hay.

Effect of Hay Quality

The purpose of a second experiment was to find out whether quality, as determined by kind of hay, affected response to pelleting. A high-quality hay (alfalfa) and a low-quality hay (sericea lespedeza) were tested.

Again 425-pound steers were fed, this time for 112 days. Two lots were fed on straight alfalfa, with one lot receiving 3/16-inch pellets and the other lot, long hay. Similarly, another two lots were fed pelleted and long sericea lespedeza. A check lot on timothy-alfalfa pellets was included in the tests. Again all calves were fed according to appetite, and mineral and salt were available.

It was shown that the apparent effects of pelleting alfalfa were similar to the results obtained with timothy-alfalfa pellets in the first trial. Daily feed consumption per calf was increased from 11.3 to 16.5 pounds, or by about one-half. In the sericea lots, however, feed consumption was increased only slightly.

Memory alone is a poor substitute for thought.

When feed consumption was expressed as feed consumed per 100 pounds of body weight, pelleting resulted in 23 and 7 per cent more feed intake for alfalfa and lespedeza, respectively. This is perhaps a more accurate measure of the effect of pelleting on feed intake than is average daily consumption. Naturally calves which gain faster are becoming increasingly larger as a test continues.

The sericea lespedeza used in these experiments was extremely fibrous and coarse. This may account for some of the difference in response.

Why the Improved Performance?

Cattle seldom gain well on all-roughage rations fed as long hay. The supply of available nutrients is limited by the amount of roughage that an animal can eat during a day, and this supply little more than meets the main-

tenance needs of the animal. Young animals, especially, have difficulty because, in relation to their body weight, they have rather a limited capacity for bulky roughages such as hay.

When animals consume an extra amount of hay as the result of pelleting, the energy supplied by a ration may be increased almost as much as when a concentrate, such as corn, is added. Pelleting of hay probably does not increase the animal's capacity for roughage, at least not greatly. The increased intake is probably due to a more rapid passage rate from the rumen or paunch. Studies at other stations have shown that ground hay remains in the pounch a shorter time than long hay.

In our studies it was observed that calves on pellets seldom ruminated—that is, chewed cuds. The fact that they spent less muscular energy in rumination may account for some of the improved feed conversion. The energy furnished by the electric motor which drove the machinery for the pelleting process was probably cheaper than the energy from feed that steers used in ruminating long hay.

It should be mentioned that simply chopping the roughage without pelleting, as was done for one of the lots in Trial 1, increased neither feed intake nor gains; nor did it alter feed conversion. The favorable results thus cannot be attributed to grinding or chopping alone. In fact, earlier work at Illinois has shown that fine chopping reduces digestibility of roughages by ruminants. This is probably because the fine particles leave the paunch before they are fermented by bacteria, or perhaps because some of them by-pass the paunch completely.

Perhaps the pelleting process insures that the feed goes into the paunch and also makes possible the bacterial breakdown of crude fiber in short order—this w i t h o u t the usual rumination process.

Five More Advantages Brought Out in Experiments

Results of the two trials at Dixon Springs lead us to conclude that pelleted hay has the following advantages for calves, in addition to those mentioned earlier:

1. Pelleting increases feed intake up to 35 or 40 per cent.

2. The extent of the increased intake is associated with the quality or type of hay fed.

3. Pelleting hay doubles or even triples rate of gain.

4. Pelleting greatly improves conversion rates of all-roughage rations.

5. Costs of gain on roughage

alone are reduced by pelleting, even when it costs $10 a ton to process the pellets.

Work in Progress

Further trials are now being made, both with pelleted hay alone and with complete pelleted rations, to evaluate more fully this rather new approach to feed harvesting, storage, and feeding.

Results to date have been so favorable that we believe there is no question as to the nutritional value of pelleted hay. Apparently the only factor limiting its use on livestock farms is the lack of machinery. Manufacturers are now busily engaged in perfecting portable machinery which they hope can be economically used to pellet hay from the windrow.

Crop Sequence Effects Crop Diseases

Severity of root rot or stalk breakage in a corn field depends to some extent on what crop the field raised the year before. Also, which hybrid the farmer plants may be just as important; some resist plant disease organisms better than others. A pair of University of Minnesota plant pathologists make these conclusions from "crop sequence" studies at the Rosemount Experiment station in Minnesota.

Thor Kommedahl and Roy Wilcoxson found almost four times as much root rot in corn following corn and wheat than in corn following oats, flax or soybeans. Also, there were more root rot fungi in fields of corn-after-corn.

However, there was a big difference in corn varieties—an important point for the farmer considering raising continuous corn. For example, there was less trouble with root rot in Minhybrid 608 — a rather resistant variety — when it followed itself than occurred with less resistant hybrids.

Stalk breakage varied; sometimes it was greater in corn following corn, wheat and soybeans and sometimes not. Corn smut was no more severe where corn followed corn than where it followed another crop.

In wheat, root rot was between two and three times more severe in fields that raised wheat the year before, compared to wheat following soybeans. Also, the disease was worse in wheat after oats and flax than after soybeans. But as with corn, there was less root rot trouble in both wheat and oats where resistant varieties were concerned, regardless of the crop sequence.

—University of Minnesota

Can You Produce Quality Eggs?

Consumer satisfaction means increased demand . .

Condensed from Poultry Tribune

W. J. Stadelman

QUALITY of shell eggs for many years has been determined by candling. The term quality with reference to eggs can be defined as all those attributes that make eggs acceptable to the consumer.

This includes cleanliness of the shell and uniformity of the albumen thickness, also size, shape, and color of the shell and the yolk.

Candling has been used to give the consumer some assurance of getting the quality factors desired.

A rather recent method of classifying eggs into different quality levels is done by determining the quality of a sample of each shipment by broken out appearance.

In order to use such a procedure, eggs from flocks of known history must be handled through the grading station. All eggs are mass candled to remove stained or dirty shells, cracked eggs, and abnormal eggs. This new method for quality determination makes it possible to give the consumer uniformity to a greater degree than is possible with conventional candling of eggs. The program is now being tried out by the U. S. Department of Agriculture in cooperation with six egg packing plants in various parts of the country.

Uniformity of eggs appears to be a universal factor desired by consumers. Well-bred strains of chickens are capable of producing the quality of eggs desired by consumers. The soundness of shells and viscosity of albumen of eggs from pullets are usually better than of eggs from older hens. When low quality eggs are delivered to the consumer, the cause is much more likely to be in methods used in handling the eggs rather than in the quality of eggs produced.

Many management factors enter into the marketing of high quality eggs. In addition to maintaining a high level of health in the flock to insure high production of eggs with sound

Reprinted by permission from Poultry Tribune, Mount Morris, Illinois

shells and viscous albumen, the care given the eggs after they are laid determines the appearance of the egg when used.

Keep Nests Clean

A clean shell is one of the requirements for quality eggs. Clean nests are the first essential in the production of clean eggs. Clean, dry litter is of prime importance. Damp, dirty litter, water fountains too close to the nests or feed hoppers, dirty egg containers and a dusty egg room all reduce the percentage of clean eggs produced. All dirty eggs should be cleaned before packaging for retail sale. Care must be used in cleaning to minimize the chances for bacterial contamination of the interior of the egg.

Frequent gathering (2 to 5 times a day) from the nests is very essential to high quality eggs. The frequent gathering gets eggs into a cooler area, reduces shell breakage, and increases the number of clean eggs.

As often as the eggs are gathered they should be taken to a cool egg room. The thinning of the albumen and the weakening of the yolk membrane are chemical reactions that can be retarded by reduced temperatures. Egg room temperatures should be maintained at 55 to 60 degrees F. with 70 to 85 per cent humidity.

Market Eggs Quickly

One of the most important factors in getting high quality eggs to market is to keep the time lapse from the nest to the table at a minimum. As most eggs are produced at some distance from where they are to be used, it normally takes from two to three weeks to get eggs from the nest to the table.

Germinating corn may be seriously damaged or killed when too much fertilizer is placed too close to the germinating seed.

As mentioned previously, 55-60 degree temperature is one way to maintain initial high quality. Another method that has been gaining in popularity during the last few years is to shell-treat the eggs with mineral oil within 24 hours of the time they are laid. The oil coating on the shell reduces the rate of moisture and carbon dioxide loss from the egg. The reduction in loss of carbon dioxide maintains a less alkaline condition in the egg white and slows down the thinning process.

Handle Eggs With Care

In order to get quality eggs that are produced on the farm to the consumer as quality eggs, they must be handled and packaged with care. Extra large or long eggs shouldn't be placed in

normal fillers. They require special handling to prevent cracks and breakage.

Always place eggs in the case or carton with the small end down. If the large end is placed down, the air cell is more likely to break away and also there will be more yolks off center. At all times, both before and after picking, eggs should be handled with care to reduce breakage or the formation of mobile air cells.

It is extremely important that the carton or case, with fillers and flats, be cooled before the eggs are placed in it. Eggs left in a warm, dry carton or case lose moisture rapidly and the grade is consequently lowered.

Nothing so far has been said about the feeding of the hens and its effect on egg quality. The feed used can affect uniformity of yolk color and shell texture. A highly pigmented feed —one containing high percentages of dehydrated alfalfa or grass — can produce abnormally dark yolks. Likewise, a ration containing no yellow corn or dehydrated grass will result in an extremely pale yolk.

Wants Yellow Yolk

The average housewife seems to want a yellow yolk, but insists on a reasonable degree of uniformity of yolk color between eggs. Feeding of an all-mash ration usually will give uniform yolk color if the hens do not have access to green feed.

Shell quality on young hens usually can be assured by having an adequate supply of calcium and vitamin D. So far, no good means have been found to assure strong shells on eggs from old hens. Recent work reported from Colorado suggests that vitamin C might help with this problem, but further research is needed before a recommendation can be made.

"I like to see a man proud of the place in which he lives, and so live that the place will be proud of him."

—Abraham Lincoln.

The final step to getting high quality eggs is to market eggs as frequently as possible — at least once each week. With once a week marketing from the farm, the eggs should be delivered to the wholesaler on Monday or Tuesday if possible. Most eggs move through the wholesale plant in two or three days and about 75 per cent of the consumers buy their eggs on Friday and Saturday. With these suggested farm marketing days, possibly a week can be cut from the age of the eggs by the time they reach the housewife.

Healthy, well-bred, well-fed, and properly managed hens will,

with relatively few exceptions, lay high quality eggs. It is important that the quality of the egg when laid be retained until the egg is consumed. To do this requires maximum efficiency on the part of all engaged in the industry. Carelessness will result in lowered egg quality and decreased consumer satisfaction and demand. To bridge the gap between the nest and skillet requires the utmost in gentle, speedy handling and the maximum in control of temperature and humidity.

Lower hog prices mean farmers must produce hogs cheaper.

Food . . . A Real Bargain

Farmers should work to make consumers understand that in "terms of the amount of work time" required to earn food—food is the cheapest it has ever been in the history of our country. That may sound like a real bold statement but the following facts prove the story:

WORK TIME REQUIRED TO PURCHASE SELECTED FOODS

		Time in Minutes		
	Quantity	1890	1925	1958
Flour	5 lb.	54	33	15
Round Steak	1 lb.	46	40	29
Milk, delivered*	1 qt.	26	15	7
Butter	1 lb.	95	60	21
Bread	1 lb.	19	10	5
Eggs	1 doz.	78	61	17
Coffee	1 lb.	109	55	24
Sugar	5 lb.	129	38	16
Potatoes	1 lb.	6	4	2

*Approximate.

People do not really understand that food is a real bargain. They look at the cost of living index—and because they make more trips to the store—they point the finger at food. Actually food has shown the smallest increase of any of the major items on the consumer price index since the war. Services listed on the consumer price index (medical care, haircuts, public transportation, postal rates and many others) have risen 50 per cent since 1947, while food has risen about 26 per cent.

—Iowa Farm Bureau Spokesman

Ways To Cut The Cost Of Borrowing Money

"6% interest" may actually cost you 9 to 18% . . .

Condensed from Successful Farming

Harold D. Guither, University of Illinois

BEFORE you borrow money the next time, read the tips in this report, then do some advance planning and careful checking before you sign any loan papers.

Remember: when you borrow, you're actually *buying* the *use* of money. You should shop around and get the cost of money just as closely as any other purchase.

Here are some ways to save:

Figure interest charges from dealers and other lenders. Usually you'll have the lowest interest charges if you get your loan from a bank or other lending agency specializing in farm loans.

However, many merchants finance their farm customers *through* local banks at the regular bank interest rate. Some lenders prefer to handle machinery this way—because, if the loan defaults, the machinery *dealer* gets the machinery instead of the *lender.*

One central Illinois implement dealer admitted to me that when machinery is financed through his company finance arrangement, interest charges may actually range from 9% to 12%—when interest charges are figured for the whole loan period.

Here's how such a deal might work: You want to buy a self-propelled combine and corn-picker combination. The cost is around $7,500. The dealer offers to finance it for 3 years at 6%. He figures 6% of $7,500 is $450 a year—or $1,350 for 3 years. Then he adds the $7,500 and $1,350 and gets $8,850 total. When he divides this amount by 3 years, he explains that you can pay off the debt at $2,950 a year.

But look out! If you accept this deal, you'll actually pay interest on some money you've already paid back.

Here's why: After repaying your first $2,500 on the principle

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(one-third), you'll owe only $5,000. But if you are charged $450 interest the second year, that figures out to be 9% interest on the $5,000 you still owe. And if you pay $450 interest the third year when you still owe only $2,500, you are paying interest at a rate of 18%. For the 3 years, your average rate under this plan would be 11%.

It should work this way: If you or your dealer will finance through a local bank at 6% *figured on the unpaid balance,* your interest costs will be much less.

On the $7,500 loan we mentioned above, you'll pay $450 interest (6% of $7,500) the first year. The second year you'll be charged $300 interest (6% of 5,000 unpaid balance). In the third year, you will pay $150 interest (6% of $2,500). So your total interest cost financing this way will add up to $900 for the 3 years—a saving of $450 over the other method.

Check the total interest charged as well as the rate at which it's figured.

Suppose, for example, you borrow $1,000 at 6% and get $1,000 to use for a year—and then pay back $1,060. In this case you are paying 6% simple interest.

But some lenders subtract $60 from the $1,000 when the loan is made and give you $940. At the end of the year you pay back $1,000. So on this deal, you are paying $60 interest for the use of $940. *The true interest rate* is almost 6.4%.

If you're an extra good risk, you may be able to get lower interest rates. Most banks and other agencies lending to farmers have a standard interest rate.

But if you own some good land free of debt, have a high investment in other property, and have a good reputation for paying off loans, you may be able to borrow at ½ to 1% less than the man whose loan carries a higher risk.

How to get a rate break. Before you approach a lender, make up a financial statement showing your total assets and liabilities. The lender can see that you have a high net worth and thus he has less risk. If lenders are competing strongly for good loans, you may get a lower interest rate.

These are really wonderful times, but most of us won't admit it for at least 25 years.

Put all your needs into one loan or line of credit. If you can figure all your money needs for a crop season or feeding period at one time, you may save on interest charges.

One Illinois banker I talked

to charges 7% interest on loans under $1,000 and 6% on loans for more than this.

Or you might be able to establish a line of credit that you can draw on as you need it—repay as you sell corn or hogs.

Here's how one Midwest Production Credit Association works this idea: It lets a farmer figure all his different money needs for the whole crop season. As the farmer needs money for fertilizer, tractor fuel, and other farm expenses month by month, the PCA provides the money. Repayments are scheduled 3 times a year—when wheat, corn, and soybeans go to market. *And the farmer pays interest only on the borrowed money he has not yet repaid.* One farmer borrowed $22,000 over a 1-year period but his total interest charges were less than $300.

Remember:

Loan fees add to costs. Some lenders may have a set interest rate but charge a service fee when the loan is made. If you can borrow at the *same cost without the fee,* you'll be money ahead.

Planned corn acreage for 1959 is up 12 per cent over last year.

For example, one lender I visited charges a loan service fee of three-tenths of the interest charge, with a $15 maximum fee.

How it works: On a $1,000 loan at 6%, the interest charge would be $60 for 1 year. The service fee figured at three-tenths of the interest charge would be $18. Since $15 is the maximum fee, the total cost for the loan would be $75. So the actual interest rate on this 1-year loan would figure out to 7.5%.

Borrow money for farm operations: Pay cash for consumer goods. Why?

Most Midwest farm production loans are made at 5 to 7% interest rates on the unpaid balance. The consumer financing of appliances and autos usually runs much higher.

For example, I found an electric clothes dryer at a reliable dealer's that would cost me $190 if I paid cash. But if I had bought it on monthly payments the interest charges would have added about $31 more—or about 16% of the dryer's cost.

A southern Illinois banker told me that auto financing at 4½, 5, or 6% rates may actually be double this amount when interest charges are added to the principal and then divided into monthly payments spread over 3 years. Also, some dealers give special discounts if you pay cash.

Signature loans. Avoid "borrow on your signature only" loans.

Here's how one small loan finance company's "farm plan" works: Suppose you borrow $500 for 12 months. Each month you pay the 3% charge of $15. At the end of the year you pay back the $500 principal and the last month's interest charge. For the 12 months you will pay $180 to borrow $500. This is 36% interest figured at the annual rate.

Put idle cash to work. While we're talking about interest, you may as well *get* all you can, too. Some farmers keep huge amounts in checking accounts that pay nothing. Put some of that money in a savings account where it wll pay interest. Most banks now pay 2-3%, some more. The interest you earn on your idle cash for short periods may not be very large. But anything you get will help offset the costs of borrowing money at a later time.

You've worked for your money —use every opportunity to make it work for you.

You Need Dairy Records to Select Breeding Stock

There's an old saying that "you can't make a silk purse out of a sow's ear." And it's just as true that the dairy farmer can't make a 10,000-pound-per-year producer out of a cow with an inherent producing capacity of only 5,000 pounds per year.

Regardless of how well a dairy cow is fed and cared for, she cannot produce more than her inheritance or "breeding" will allow her to produce. For example, if the inherent producing capacity of a cow is limited to an average of 350 pounds of butterfat per year, no amount of extra feeding or better management will increase per production above that amount.

Production records are essential for selecting breeding stock to improve the inherent producing capacity of the herd. The quickest and surest way to improve the potential producing ability of a herd is by mating good herd sires with high-producing dams. With production records, the dairyman can pick out long-time, consistently high-producing brood cows that have transmitted their inherent capacity to their daughters and sons. Also, he can evaluate his herd sire by comparing daughter-dam records.

—*West Virginia University*

Moisture Testers For Soils And Crops

These devices are proving themselves vital to sound management of irrigation, grain drying and storage . . .

Condensed from Implement & Tractor

G. W. Isaacs, Purdue University

WATER, available in the right amounts at the right time, is one of the most vital factors in the production, harvesting, and storage of farm crops. Farmers who are equipped to irrigate need to know the amount of water available to plants in their soil to know when to start irrigating. The amount of moisture in grain and forage crops determines when they are ready to harvest, dry enough to store, or what their market value may be.

Farm moisture testers are playing an increasingly important part in modern farming methods. For example, crop dryer users, particularly those with batch or continuous dryers, have found they can manage their drying systems more effectively with the aid of a moisture tester.

Some farmers have made the mistake of drying grain more than necessary in order to be safe against spoilage. This can be a costly procedure, particularly if grain is to be marketed. For example, a market bushel of shelled corn consists of 56 lbs. at a moisture content *no more than* 15.5 per cent. If you sell corn at 11 per cent moisture, you still sell 56 lbs. of corn per bushel. A fair-sized farm operation can lose enough in one year in shrinkage of this type and wasted fuel to pay for a moisture meter costing over $100.

Moisture testing equipment has been commercially available for many years; however, not until very recent years have there been testers available that were low enough in cost to be considered for general farm use. The electric moisture meters used by most grain dealers cost from $300 to $600. Electric crop moisture testers for farm use, although perhaps not quite as accurate as those used by grain dealers are available at prices ranging between $35 and $150. Some farmers have bought used, factory-reconditioned meters of the type

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used by grain dealers at a fraction of their original cost.

Testers for Farm Crops

Electric moisture testers are of two general types: those that measure electrical resistance and those that measure electrical capacitance. Both types place a small sample of the material tested in an electric circuit. The amount of moisture in the sample determines the behavior of the electric circuit and affects the reading of a meter.

Sound management, based on record-keeping, is the key to profitable dairying.

Grain moisture meters of this type require a separate calibration for corn, oats, wheat and other crops. They also require corrections for temperature when they are used at temperatures of other than approximately 80 degrees. Many electric moisture meters are portable and can be powered by batteries so they can be used anywhere on the farm. Moisture readings can be taken very quickly, each reading requiring less than a minute to obtain. Some testers of this type require weighing the sample before testing. Most of them are calibrated only for grain, but one manufacturer supplies a calibration for estimating the moisture content of hay.

Testers that Heat Sample

Among general types of moisture testers are the ones using heat from a heat lamp, engine exhaust or other source to force all moisture out of the sample. By weighing the sample before and after the heating, the amount of moisture can be calculated. Most of the testers of this type come equipped with a specially calibrated scale which indicates percentage moisture content directly for a particular original sample weight. Approximately 20 minutes are required to test a sample on this type of tester.

Oil Distillation Testers

The oil distillation tester is another type that heats the sample. The original grain tester operating on this principle was the Brown-Duvel device developed many years ago by USDA researchers. This tester heats the sample in oil to boil off all of the moisture from it. The moisture is then condensed and measured as liquid water. This direct method of moisture determination can be very accurate for grain; however, the equipment is not portable and the test requires about 20 minutes. A simplified version of this method boils the sample in oil and measures the weight loss of the sample and oil to determine moisture content.

Soil Moisture Testers

Soil moisture testers sold for farm use are two general types, the *electrical resistance* and the *tensiometer*. The electrical resistance types measure the electrical resistance of the soil itself by means of an electrical probe, or they measure the electrical resistance of a unit made of plaster of Paris, nylon, or glass fibre which is buried in the soil. These units absorb moisture from the soil and change their resistance according to the moisture content of the soil.

The tensiometer type of soil moisture indicator consists of a porous ceramic vessel which is buried in the soil. The vessel is initially filled with water and sealed. As the soil dries out, water from the vessel is absorbed by the soil, creating a vacuum in the vessel. This vacuum is measured by a manometer or vacuum gage as an indication of soil moisture.

Making Accurate Tests

Accurate moisture determinations with any moisture tester can be made only if the manufacturer's instructions are followed to the letter. Operating any farm moisture tester is a simple matter when the user has carefully read and understands the instructions.

Take a representative sample. Draw samples from several points in the product mass. Test as many samples as you have time to; in general, the more samples you test and average into your results, the more accurate will be your determination. Draw samples from near the center of the grain mass, not just from the top. A grain probe is very helpful for this. Keep grain samples in a closed container until tested.

A spinster tells us she does not need a husband, because 'I have a dog that growls, a fireplace that smokes, a parrot that swears, and a cat that stays out all night'.

Measure the sample temperature on electrical crop testers and make a temperature correction. If the sample is 20 deg. F. off the calibration temperature of your tester, the moisture content indication will be approximately one moisture percentage point low on most electrical testers. Samples should not be tested immediately upon removal from heated air grain dryers, for the temperature of the sample may be too high for accurate correction of the meter reading. Also, some meters are affected by the fact that the outer surfaces of recently dried grain are dryer than the inside of the kernels. This may make your meter read too low.

If you must test recently dried

grain, at least let it cool to less than 100 deg. F. for more accurate temperature correction. Place some samples in tightly closed fruit jars. Test them just as soon as they are cool and again after letting them stand for several hours. The difference between the initial and final readings will give a fair correction factor which you can use on future tests to allow for unequal moisture distribution in recently dried material.

Never test cold grain samples in a warm room with an electrical tester. A thin film of moisture may condense on the kernels and cause too high a moisture reading. Either let the grain samples warm up in a closed container or operate your tester in an unheated room.

Don't try to hurry the test with testers that heat the sample. Stopping the test before all the moisture is removed from the sample will produce a reading that is too low. Operating at too high a temperature may burn the sample and cause a reading that is too high. Weigh carefully. The accuracy of this method depends on it.

Lifesaving Program for Barnyard Babies

A seven-point "life-saving" program for America's "barnyard babies" which are born on farms, is offered to livestock owners by the American Foundation for Animal Health.

1. Make sure mother animals get a complete ration, including the correct balance of proteins, vitamins, and minerals. If deficiency symptoms appear, call a veterinarian.

2. Provide clean, dry, draft-free quarters for brood sows, cows, and ewes. Keep them free of filth, lice, and mites.

3. Be on hand to assist in births, if necessary. Disinfect navels of new-born animals.

4. Make certain young animals are nursing properly. All animal babies need plenty of their mother's first milk (colostrum).

5. Be especially alert for signs of scouring. It may indicate disease or improper feeding.

6. Have pigs vaccinated against hog cholera about weaning time. When the veterinarian vaccinates against cholera, check as to possible need for other types of vaccination.

7. Obtain a prompt diagnosis and take corrective action the moment signs of sickness appear; it may mean the saving of young animals which would otherwise be lost. —*Kentucky Farmer*

Preserving Nutrients In Corn Silage

Stacks do not compare with upright silos in the preservation of nutrients.

Condensed from
South Dakota
Farm and Home Research

A. W. Halverson, W. C. McCone, and *O. E. Olson*

HOW does the storage of corn in stacks compare with other methods of storage for the preservation of nutrients?

Two years of experimental work in South Dakota have been concluded, and the answer is, "Apparently not very well." The following description of the experiment and results will help in understanding how an answer was arrived at.

How the Work Was Done

In September of 1956 and 1957, a sealed upright (Harvestore), a conventional upright silo, and a stack were filled with corn forage. In 1956, the stack was the round type and in 1957, it was the long type.

The sealed and conventional upright silos were filled in the usual manner. The round stack was shaped with snow fence and packed by men continuously during the filling. The long stack was packed with a tractor.

Samples were collected for chemical analysis during the filling process, and all of the green forage that went into each silo was carefully weighed. The silage was fed during the fall and winter. During feeding, the silage was carefully weighed out for the cattle. Weights of spoiled material not fed and of that portion the animals refused to eat were also determined. In addition, samples were collected at regular intervals for analysis.

The Losses

With the sealed uprights, there was no spoilage and none of the silage was refused. Some of the dry matter ensiled was not accounted for (8 and 9%). This represents losses due to juice runoff, handling, and fermentation. It also includes some loss of dry matter in the moisture determination, which if corrected for

Reprinted from South Dakota Farm and Home Research, Agricultural Experiment Station, South Dakota State College, Brookings, South Dakota

would probably increase the per cent dry matter consumed by 2 to 3%.

With the conventional upright silos, about 80% of the ensiled dry matter was actually consumed. Here again this value may be a few per cent low because of small dry matter losses during the moisture determination. There was some top spoilage and some feed refused. The per cent of material not accounted for was somewhat higher than for the sealed upright, no doubt because of greater fermentation loss. Covering the top of the silage with plastic could be expected to decrease losses.

Slightly over half of the dry matter put into the stacks was consumed by the cattle. There was a considerable amount of spoilage which was not fed. The per cent of dry matter not accounted for was large, and again this was no doubt the result of large fermentation losses.

Why Fermentation Loss

When green material is ensiled, certain bacteria go to work producing acid from the carbohydrate that is present. After a certain amount of acid is produced, the bacteria stop working —provided air is kept away. This production of acid by bacteria is called the silage fermentation. During this fermentation, only part of the carbohydrate that is used up is converted to acid. The rest ends up as water and as carbon dioxide (a gas) and this part represents a fermentation loss. While we must always expect some of this when silage is formed, the loss can be kept at a minimum where air is kept away from the silage.

When air is not kept away from the silage, additional fermentations by undesirable bacteria, yeast, and molds take place. These cause spoilage and produce much heat. They use up more and more carbohydrate, attack and destroy proteins and fat, converting them to gases and water. This means excessive destruction of nutrients.

With the stack, where exposure to air is greatest, fermentation losses are greatest. The data clearly show how important it is to reduce exposure of silage to air if excessive fermentation and spoilage losses are to be prevented.

Feeding Spoilage

It is not uncommon, of course, to feed much of the spoilage along with the good silage. We have done this, too. In so doing, we can increase the per cent of ensiled dry matter that is consumed.

How much good, though, does this spoilage do the animal? Attempts to determine its digestibility with animals have not been

successful. The animals would not eat enough. Therefore chemical determinations of digestibility have been used. While not precise, these methods probably give results satisfactory for use in comparisons. Spoilage has always been found to be much less digestible than either the fresh forage or the unspoiled silage. Furthermore, spoilage has been observed to decrease silage consumption when mixed with good silage. In view of this and the apparent decrease in digestibility, it is doubtful that spoilage should be considered as having much real feeding value.

Chemical Composition

The method used for storage was found to have very little effect on the chemical composition, insofar as it was determined, of the unspoiled silage. Feeding trials, which will be discussed later, have indicated no great difference in feeding value of unspoiled material from the different silos.

There is one exception, and that is in the case of carotene (vitamin A). This vitamin is quite well preserved in the sealed and conventional upright silos. In the stack, however, it is largely destroyed except near the bottom in the center. This again is the result of excessive exposure to air since carotene is readily oxidized to inactive compounds. It appears unwise to rely upon stacked corn silage to supply the carotene requirements in rapidly growing or high producing animals.

Feeding Trials

The results of feeding silage from the stacks and from the conventional upright silos were also studied.

Research is being directed toward making wool completely washable, resistant to accidental creasing, stain repellent, and able to hold permanent pleats. A new inexpensive process has made moth-proofing low-cost and practical.

In each of the 2 years, the amount of green forage put into the stack was the same as the amount put into the conventional upright. For the stacks, however, the feeding periods were shorted. This was because while the feeding rates were similar, the recovery of unspoiled silage was so much lower from the stacks.

Rates of gain and feed efficiencies appear somewhat better for the cattle on the stack than for those fed from the upright. The shorter feeding periods with the stacks account for this. Actually, the feeding value measured over equal periods of time was found to be very similar for the two types of silage.

To briefly summarize the results, feed costs per hundredweight of gain were considerably more with the stack than with the upright. These differences in feed costs can often mean the difference between a profit and a loss.

Conclusions

There is little doubt that stacking is our most wasteful method of storing corn forage as silage. The reason for this is its failure to exclude the air, which means that excessive spoilage and fermentation losses occur.

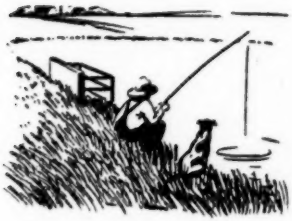
The use of preservatives, while not reported on here, has been found to be of no value in reducing losses in stacks. Plastic covers offer some promise in keeping losses down. If used, they must be kept free of holes if satisfactory results are to be obtained. This may be difficult because they are subject to attack by rodents and they are often ripped open by our high winds. When they are used, it is suggested that once feeding is begun it proceed at a rapid rate. Opening the cover for feeding will often allow the rapid infiltration of air and with long-term feeding, the spoilage and fermentation losses become quite large.

While not all types of storage were included in this study, a basic principle has been clearly demonstrated. The better job that is done of keeping air away from the silage, the better will be the preservation of nutrients. While initial costs, and many other factors must be considered in determining what kind of silo to use, the matter of efficiency of preservation should also be given high priority in arriving at a decision.

Toms Do Best on Range

Trials at the Ohio Experiment Station show that tom turkeys will gain faster while roughing it out-of-doors than they will indoors. The experiments were conducted to determine if the breed or sex of turkeys has any bearing on raising turkeys on range or inside. The toms raised on ladino clover range consistently weighed more at 24 weeks of age than those raised in confinement. The Ohio trials showed that the range-reared Bronze male turkeys averaged nearly two pounds more, while the Large Whites averaged a little over a pound more than the toms raised in shelter. The rate of gain for female turkeys, however, was found to be the same whether they were raised outdoors or indoors, although the range-reared females of both varieties required a little less feed per pound of gain than those raised in confinement. —*Turkey World*

Farm Ponds For Family Fun



But keep them clean!

Condensed from
The Hoosier Farmer

E. H. Wilson

THE family that has a farm pond can look forward to good family recreation right at home.

Swimming and fishing may be secondary to water supply for livestock and flood control, but to most farm boys it's "fishing first." Old boys and young boys alike could well spend more time at the "ole fishin' hole."

Let's take a look at the typical farm pond. It's Saturday evening and you are there with your family. The nature of the farming business requires almost full-time attention, and for this reason the farm family enjoys this piece-meal kind of vacationing.

There's one thing that can be a nuisance in the farm pond to the fisherman and the swimmer. Long strings of green growth often make swimming unpleasant and to the fisherman—often he gets mostly long green growth instead of fish. This green growth, algae by name, is a menace to farm ponds.

That Dratted Algae

If algae is permitted to grow, the pond water or surface water will have tastes and odors. Algae may grow to the extent of clogging the filter and overflow screen of the pond.

To control algae, the pond should be treated in early spring and at regular intervals during the summer. If algae control is not carried out regularly, beginning in the spring, the quantity of algae will build up in the pond, and later attempts at control will result in heavy deposits of dead algae at the overflow or filters. Bad tastes and odors will develop in the water from rotting of the algae in the pond.

Copper sulfate will do the job of killing algae in the farm pond. According to Purdue, it should be applied every two to four weeks from early spring until Sept. Caution should be used

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with copper sulfate — IT IS TOXIC to humans and fish if handled improperly. Commercial grade copper sulfate crystals should be applied by placing them in a burlap bag and dragging the bag across the surface of the pond. The pond should be criss-crossed at 10-foot intervals. This will give an even distribution of the copper sulfate in the pond.

Copper Sulfate Recommended

Three to four pounds of copper sulfate per million gallons of water will give the maximum algae kill and the minimum damage to fish life. If more algae kill is desired, eight pounds per million gallons will kill more algae, but it will kill the catfish and the perch. Sixteen pounds of copper sulfate will kill even more of the algae but it will kill the pan-fish and the bass. Up to 95 pounds of copper sulfate per million gallons of water can be used and the water will still be safe for human consumption. The same 95-pound application will also kill all the fish.

There are several chemical herbicides of a commercial nature available for use on farm ponds. Many of these preparations are liquid and easy to apply. Instructions on the label of the container should be followed carefully to obtain maximum results of killing the algae and not the fish.

How to Estimate Volume

The volume of water in the pond may be estimated by the following relation:

V=0.4 D X A where V is the volume in acre-feet.

D is maximum existing depth of water in the pond.

A is water surface area in acres.

To convert acre-feet to gallons, multiply by 326,000.

Example: A pond with a surface area of ½ acre, and depth of 10 feet in the deepest place, the volume is figured as follows:

V=0.4 X 10 X 0.5 equals 2.0 acre-feet.

Volume in gallons is 2.0 X 326,000=652,000 gallons.

Costly Fires

Fires in the United States destroyed $156 million in farm property last year, taking the lives of about 6,000 persons. National Fire Protection Association records show that the largest number of these deaths were in the younger and older age groups. Nearly one-third of the fatalities were under 15 years of age and one-half were 45 years of age or older. Many more people suffered severe burns and injuries. —*Louisiana State University*

Can Fertilizers Effectively Maintain The Fertility Of The Soil?

Sound fertilizing involves much more than the application of fertilizer mixtures . . .

Condensed from
Farming In South Africa

H. Klintworth, College of Agriculture, Potchefstoom, South Africa

CAN the productivity of a soil be maintained by applications of fertilizer only?

This question is becoming more and more important, especially as the prices of agricultural products are showing a tendency to drop. As the cost of fertilizers is not a negligible item in the farmer's budget, it is imperative that fertilizers should give adequate increase in yields. Should fertilizers fail, over a number of years, to increase the yields sufficiently to pay for the costs, it would obviously be foolish to use them. Only by means of long-term experiments, in which the responses to all plant foods are measured while fortuitous seasonal effects are eliminated, can one obtain reliable information on this matter.

Wrong Advice

Despite this farmers are frequently given advice which is based on purely theoretical considerations. They are told that as all crops remove nitrogen phosphate and potash from the soil, sound fertilization really involves little more than the application of the same amount of plant food in the form of fertilizer mixture. If they put back all they have taken from the soil it can never become poorer but must retain its productivity for ever.

The solution appears to be so simple and so obviously correct that one wonders why so many countries waste so much money on fertilizer experiments? Where is the difficulty? True, we must put back what we have taken out. But the questions which we have to decide are (1) what has been taken out of the soil by the crop and (2) can what has been taken out be replaced completely by the chemicals in the fertilizer bag?

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When new land is broken up and planted to a soil-exhausting crop such as corn, a whole series of processes are set in motion which all tend to lower the productivity of the soil gradually. Not only are plant foods removed, but the structure of the top soil is broken down by the repeated mechanical operations, the beating action of rain and by exposure to the direct rays of the sun. At the same time the delicate equilibrium between the soil organic matter and the natural vegetation is upset. A loss of organic matter occurs, the decomposition of organic matter being more rapid than its replenishment by the corn roots. Plant foods, which were locked up in the organic matter, are thus liberated and may be absorbed by the plants. But the loss of organic matter also has very harmful results.

The increase in soil acidity, which is causing so much concern, is directly associated with the decomposition of organic matter. Further, phosphates tend to be fixed by the soil so that plants find it difficult to absorb them and the elements calcium and magnesium tend to be washed out by rain water. Also, the soil in time loses the good physical qualities which it possessed by virtue of its organic matter.

By allowing decomposition of organic matter to proceed too far, the very life of the soil is destroyed. Obviously, far more is removed than the chemicals which can be replaced by adding fertilizers—if the soil is planted to a soil-exhausting crop continuously.

Fertilizing

If the soil were merely a dead, inert medium, whose structure remained constant and was not affected by cultivation or by the crop, these arguments would not hold good and we would need to concern ourselves only with the replacement of plant foods.

This is actually the case in the artificial system of crop production known as the "soil-less culture" method. Ordinary soils, however, are living and dynamic organisms and are therefore subject to changes and deterioration. Their physical properties alone may have a far greater effect on productivity than the plant foods they contain. Many a long-cultivated soil has become unproductive despite a high plant food content or regular use of fertilizer mixtures.

Thus, it is not enough merely to replace the plant nutrients which have been removed. A means of replacing the organic matter which has been lost must be found so that the physical and biological properties may be pre-

served. In the absence of sufficient quantities of organic fertilizing materials, this can be done only by adopting a crop rotation system suitable for the soil, climate and purpose in view, accompanied by the application of the necessary fertilizers. A crop rotation system of this nature would normally consist of both soil-degenerating crops, such as corn, and soil-rehabilitating crops, such as one of the legumes or grass. No attempt should be made to maintain the fertility of the soil at a constant level, but fertility accumulated in the soil by the rehabilitating crops should be converted into saleable produce by the following soil-exhausting crops.

Accumulated Fertility

A good example of how to make use of accumulated fertility is the supply of nitrogen to corn. Most of the nitrogen in a soil occurs locked-up in the organic matter. In this form it is unavailable, but as result of microbiological activity, the organic matter is decomposed and mineral nitrogen, in the form of nitrogenous salts, is set free and can be taken up by the plants. When a land is planted to corn there is a gradual loss of soil organic matter and we can do nothing to prevent it.

It is therefore obvious that:

1. The corn crop would not respond to nitrogenous fertilizers unless the seasonal rainfall was very high and the yield considerably higher than average. Experience has shown that even after 35 years the average increase in yield obtained from nitrogenous fertilizers is still hardly enough to pay for the cost of the fertilizer.

Good management consists of encouraging average people to do the work of superior people.

2. The yearly application of a nitrogenous fertilizer, to replace the amount of nitrogen removed by the crop, would not maintain the nitrogen content of the soil at a constant level. It would, in fact, be a waste of money as the nitrogen would be lost either by leaching or by denitrification. It would not stop decomposition of soil organic matter and further degeneration of the soil would most likely reduce the yield of corn.

If only the nitrogen could be replaced in the same form in which it is removed from the soil, i.e. in the form of humus! We must put back what has been taken out! But as soil, humus cannot be purchased and redistributed in the soil, there is therefore no alternative but to build up the humus in the soil by means of suitable crops.

Nitrogen

Nitrogenous fertilizers should, however, be applied when the soil is planted to grass, a non-leguminous soil — rehabilitating crop. Well-fertilized grass increases the organic matter content of the soil and, therefore, also the organic nitrogen. While grass is on the land fertility is accumulated in the soil, ready for exploitation when the land is again planted to the following cash crop. It is, therefore, of the utmost importance that the grass be well fertilized, particularly with nitrogen.

A cheaper way to accumulate soil organic nitrogen and humus, is to plant legumes.

Rotational Grazing

Long-term experiments at the Potchefstroom College of Agriculture and Experimental Station have proved that it is impossible to preserve soil productivity under continuous corn with fertilizers only, even if all the plant foods are replaced every year. To preserve productivity a suitable crop rotation which maintains the organic content of the soil and its physical properties, must also be practiced. Correct fertilization requires that all the elements removed from the soil by the crop and by drainage should be replaced, but only if they are not present in excessive amounts. The element nitrogen can be replaced most economically by a leguminous crop in the rotation system.

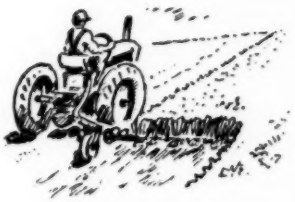
Ever hear of the chap who was so conceited that he joined the Navy so the world could see HIM?

When considering a fertilizer program the requirements of the crop rotation should be considered, in other words, one should fertilize for the crop rotation not so much for the individual crop. It is fundamentally wrong and can only have a harmful effect on agriculture to advise farmers that they can preserve soil productivity under monoculture merely by the application of fertilizer mixtures.

This will be a surprise to many folks: There are still about 50 real farms within New York City limits. These farms get $212 in annual yield per acre, while Iowa, considered the best farm land, gets only $48 per acre.

A city slicker until recently had a dairy farm with a 200-quart-a-day yield in Brooklyn. One city farm has been run for 250 years and the farmhouse is 238 years old. And this in New York City, mind you. —*New England Homestead*

Are We Wasting Roughage?



Economice are in favor of wilting grasses and legumes before ensiling . .

Condensed from
New England Homestead

R. P. Atherton

THERE is an old adage known by all, "Haste makes waste"; and in the haste of ensiling grasses and legumes we have been wasting perfectly good food nutrients.

The forage harvester is one of the many pieces of mechanical equipment that has taken the ache out of many farmers' backs. It's a wonderful machine and does a thorough job of harvesting grass silage in a minimum of time, but, have we been too hasty in its use? Or should we ask, "Have we used it to our best advantage?"

In our haste to make grass silage and "beat the weather" we have blythly gone ahead and ensiled grasses with a direct cut machine under all kinds of weather conditions and with no thought as to the moisture content of the material that went into the silo.

Farmers did think about it when the silo became a "leaky tub" oozing evil smelling liquid and later in the winter months when he came into the warm kitchen smelling so bad of grass silage that his wife threatened a divorce! It was too late then to do much about it for that tub of grass silage *had to be fed.*

All of these conditions, coupled with research, have made us take another long look at grass silage, considering the use of the direct cut and resulting food losses or as an alternative, the wilting process.

Preserving More Food Nutrients

Grass silage has to normally heat and ferment in order to preserve itself and make good silage. Fermentation is caused by the carbohydrates in plant material. Such fermentation produces organic acids, namely: Butyric, Lactic, Formic and Acetic. The Massachusetts Agricultural Experiment Station in a bulletin published in 1954 stated:

"Good quality silage is indicated by:

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(1) A pH of 4.5 or less;

(2) Low volatile base content (0.5 per cent or less expressed as ammonia);

(3) Lactic acid content of 3 to 5 per cent or more and

(4) Butyric acid content of 2% or less. It is the high Butyric acid content that makes for poor silage. Butyric acid also causes the evil smell that is found in some grass silage and 'clings' to your clothes."

As much as 92 per cent of the total feed supply of sheep can be derived from forage, say animal husbandry scientists.

Water content of grass silage is all important. If we are to have good feeding material, there must be enough moisture in the material to allow proper packing, sealing and exclusion of air, yet too much moisture is equally as bad.

The U.S. Dept. of Agriculture at their Research Station at Beltsville believe that material with about 65% moisture content for the ordinary upright silo is about right.

They offer the following table in their latest bulletin, "Problems and Recent Improvements in the Preparation and Use of Grass Silage," by L. A. Moore.

Wilted, 65% Moisture
100 Ton Crop
Result
65 Ton of Water
35 Ton of Dry Matter as Silage

Direct Cut, 80% Moisture
175 Ton Crop
Result
140 Ton of Water
35 Ton of Dry Matter as Silage

After looking at these figures, the question might well be asked, "Can you afford such an expensive 'tub' to hold 75 Ton of Water?" That is what happens where "direct cut" method is used vs. the wilting process.

This isn't the only problem, for there is a direct relationship between the feed value of high moisture silage and lower moisture silage.

In the case of:

Wilted Material
12% Fermentation Loss
3% Field Loss

15% Total Feed Loss

Direct Cut
15% Fermentation Loss
13% Seepage Loss
0% Field Loss

28% Feed Loss

Here is a difference of 13% of dry matter or 4.5 Ton of dry matter which is equal to about 5.3 Ton of hay equivalent, or 1¾ Ton of hay.

You can set your own value

as to hay, but as a minimum it's worth $25 per ton or a loss of $43.

Can the Crop Be Wilted?

Since the advent of the forage harvester, we have said, "Now you can beat the weather—hay in the rain, if you want—for haying weather isn't important. Cut it early, ensile it and the job is done; do it quick for you've saved the crop."

A practical difficulty does present itself. You must cut your first crop of grass silage in early June. If you harvest legumes, they are very succulent and probably contain at least 80% moisture. You are short of time, for in a short time the grass silage will be in the hay stage. Can you wilt?

Wilting does take time. You cut the grass and let it lie in the swath of the windrow; if weather is cloudy—it wilts slow—3 to 5 hours, if sunny—2 to 3 hours may do the job. A trip is made with the forage harvester down the field. With the advent of hay crushers and crimpers, there is a feeling that these can be used to advantage to take moisture out of stems, but that still means an extra trip! Are these extras worthwhile? (Turn to the figures quoted previously and determine your own case.)

Someone asks—"What about a preservative, won't that take up moisture?" Probably the best such material to take up moisture is beet pulp! They figured at Beltsville that a heavy legume crop—cut direct into the silo, would have at least 80% moisture. To decrease this to 70% moisture content would require 20 Ton of beet pulp for the 175 Ton of fresh green material or 230 lbs. per Ton. Let's push the pencil—Beet pulp at $60 per Ton is 3c per lb. or $6.90 per Ton of silage—175 Ton X $6.90 =$1,206.50.

Can you afford to add this cost to the feed in the silo? There is this much to say—The feed is there and will replace some feed when fed to the animals. Actually there is a percentage loss of this feed, probably as much as 15% loss through fermentation and seepage, so it isn't all there for the cows to use as feed!

The addition of this amount of beet pulp also results in the silage dry matter containing 36% of beet pulp as it is stored. Can you afford to build a silo to store that amount of beet pulp?

Feeding High Moisture vs. Wilted

The cow also has some information to present. How much can she or will she eat of high moisture material? The Beltsville Station found out some facts by testing silages and cows.

These figures can answer many questions posed by farmers. More

silage in weight will be consumed of high moisture material, but less pounds of total dry matter is actually eaten and dry matter makes milk as well as puts weight onto animals! It further points up to the use of "Haylage" in gas tight silos (trade name, Harvestore) with the *highest amount of dry matter consumed per 100 lbs. of live weight of animal.*

Few farmers have been able year after year to have the same quality of grass silage or the same moisture content in silage. These facts can help explain why, "one year the cows milk well and the next year not as well."

Is There a Difference?

The exclusion of air is all important as stated previously. A horizontal silo has much more area open to air and weather than a tower silo. Firm packing of the material is necessary in both types of silos. The tower silo carries a greater amount of pressure over a smaller area and, therefore, can use material for packing that has less moisture content.

Therefore, a higher moisture content is probably more advisable for the horizontal silo than the upright. There is definitely a need for proper coverage of these silos. Plastic covers, prop-

Crop Harvested	Moisture Content of Silage	Dry Matter Eaten Per 100 Lbs. of Live Weight per Day
Orchard Grass		
First Cutting (Boot Stage)		
Fresh Green	79.7	1.36
Wilted	66.9	2.00
Second Cutting (early hay stage)		
Fresh Green	71.8	2.08
Fresh Green & 5% Dry Grain	69.7	2.21
Wilted	59.5	2.11
Alfalfa		
First Cutting (1/10—1/4 bloom)		
Fresh Green	77.9	1.23
Wilted	72.7	1.94
Wilted	65.6	2.34
"Haylage" (gas tight silo)	45.7	2.52

erly weighted down to exclude air and water, will pay for themselves many times over.

It is estimated that plastic materials, properly applied to the horizontal silo to exclude the maximum amount of air, will save at least 7 lbs. of dry matter per square foot which would otherwise spoil. You can figure what you would save on your own horizontal silo, if you have one.

Summary

To direct cut or to Wilt? From a practical point of view,

1. A farmer who has a perfectly good direct cut forage harvester probably cannot afford to change it unless it's ready for a change.
2. If you are on a zero pasture program, then a direct cut machine is necessary and two machines are too expensive.
3. Where a direct cut is used: Don't make grass silage in the rain—wait until the dew is off when possible — always use a preservative to increase the carbohydrates and to decrease Butyric Acid in the silage.
4. Can you afford to build an expensive silo to hold a high amount of water found in direct cut?
5. Fermentation losses and seepage losses are high where a direct cut is used.
6. Wilting of silage provides:
   a. Better quality;
   b. Increases palatability;
   c. More dry matter consumption per cow;
   d. Less number of trips from field to field with fewer loads.

One determined man with a rusty wrench can accomplish more than a loafer with a kitfull of new tools.

Every farmer will have to make his own decision about this important matter. Wilting means higher feed value of the silage, though it takes longer to make silage. It would appear that the economics are in favor of wilting the grasses and legumes before ensiling.

A new fly control—call it "6-CC"—which is now in final development stages at the USDA Agricultural Research Center, Beltsville, Md., is reported to be only about 1/8th as toxic to animals as pyrethrum—only about a third as toxic at alethrin. (The scientists say these two have been the safest insecticides in use to date.)

— *Farm and Ranch*

Stop That Seepage From Your Silo

Don't let your feed "run" away . . .

Condensed from Pennsylvania Farmer

R. E. Patterson and *J. W. Bratzler,* Pennsylvania State University

IS silage seepage a problem with your tower silo?

If so, it is causing a loss of water, nutrients and dry matter. The odor can be as bad as a skunk and traces of it may kill fish if it reaches a stream. More than one farm wife has complained that seepage destroyed good domestic water supply.

Can this situation be avoided? Yes, or at least greatly reduced. Two methods are available:

1. Reduce moisture content by wilting or by adding dry matter, such as beet pulp, corn and cob meal, or small grains.

2. Provide seepage pits.

The old saying of an ounce of prevention being worth a pound of cure certainly applies here. The best way of reducing silage seepage is to wilt the forage down to about 70 per cent moisture in the field if weather permits. Experimental results indicate this to be about the optimum moisture content. Much over this will cause excess seepage and much below this may decrease quality. It is especially recommended to wilt the silage in the bottom half of the silo because of the high pressures developed in this area. Direct cut silage on the top ten feet of the silo may cause little or no seepage and will give a better seal.

Even if all forest land in the United States capable of growing commercial crops of trees is put fully to work, this country may have difficulty meeting its future timber needs.

How much water is lost? One ton of grass cut at the proper time for silage will contain about 83 per cent water or 1,660 pounds of water and 340 pounds of dry matter. This material when wilted to 70 per cent moisture will contain 793 pounds of water and slightly less than 340 pounds of dry matter or a loss of about 867 pounds (104 gallons)of water.

The following information is recorded from experimental tests on seepage losses in 1958, from small silos at The Pennsylvania

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State University and under the guidance of Dr. J. W. Bratzler:

Forage as Ensiled	2,240.00 lbs.
Dry Matter Ensiled	334.88 lbs.
Water Ensiled	1,905.12 lbs.
Per Cent Water when Ensiled	85.05%
Water Lost	456.27 lbs. (54.62 gallons)
Per Cent Water when Removed	76.05%
Dry Matter Lost in Seepage	28.35 lbs.
Per Cent Dry Matter Lost	8.47%

Lower losses and higher per centage of water in tables is due to the small silos. Increased pressures in a 14-foot by 30-foot silo would reduce this to about 73 per cent or a loss of about another 372.5 pounds of water or a total loss of 828.77 pounds of water (99.2 gallons). Since a 14-foot by 30-foot silo solds 93 tons of ensilage, the loss according to the above figures would be about 8,287 gallons of water and at least 2,503 pounds of dry matter.

Where does this water and dry matter go? If wilted, the water and products of respiration pass into the atmosphere. If put in the silo, they seek the path of least resistance through the walls and bottom of the silo, then probably to a low spot on the surface of the ground. It may even seep down into the well or spring, farm pond or stream.

How can we best collect this seepage? N. Henry Wooding, extension agricultural engineer, in his publication, "Suggested Methods of Controlling Seepage from Your Silo," states:

"The simplest way of collecting the seepage from the silo is with a tile drain placed in the bottom of a stone-filled trench dug around the base of the silo. One way to dispose of the seepage from your silo is to collect it in a sump, haul it off and dump it in a field where it can be plowed or worked into the soil . . . A second method consists of piping the juice through a sewer tile to a large stone-filled sump, or a dry well located outside the barnyard and down wind from the house and milkhouse."

Atrophic rhinitis, spread to young pigs by "carrier" animals which may show no signs of the disease, causes persistant sneezing, nose bleeds and failure to make satisfactory gains. Veterinarians advise purchasing boars and gilts only from herds free of this disease.

With this second method extreme caution must be used to prevent contaminating your well, spring, or other water supply.

Which system is recommended? This question was also asked

Joe Taylor of the Dairy Extension Section and John Baylor of the Agronomy Extension Section at the Pennsylvania State University. All agreed that wilting grass silage to about 70 per cent moisture was desirable, but hastened to add that extensive delays in harvesting may result in greater loss of total digestible nutrients due to increased maturity.

Recent tests indicate less time is required to harvest by wilting than is normally assumed because substantially less water is hauled to the silo.

If you are going to install a seepage system be sure to have the proposed system approved by the local milk inspector before installation.

Beef Cattle Price Outlook

The only cloud in the long-range cattle price outlook may appear in 1960-62, says a widely known Purdue University agricultural economist. J. Carroll Bottum points out that these years may bring together peak marketings of hogs, cattle and sheep to force prices downward.

Production of feed grains has reached the point that if this grain is disposed of through livestock it will depress hog and cattle prices to relatively low levels, he adds. Feeding ratios might remain normal in such a situation, but if the supplies are large and livestock prices low, farmers still will have an income problem.

What can individual farmers do about it? Bottum suggests these courses of action:

"We can work to develop and support more realistic farm programs which bring grain supplies more in line with livestock and market needs.

"We can guard against over expanded livestock enterprises when the liquidation phase of the particular livestock cycle is about to start.

"We can organize our livestock enterprises to reduce the per unit cost of labor and equipment, the high cost items, to a minimum.

"We can adopt the latest paying practices in the handling of our livestock, thus cutting costs.

"We can give continued efforts to producing the type and quality of livestock in demand and market it at the season of the year when the demand is greatest."

—*Farm News From Purdue*

FUN ON THE FARM

A Collection of Jokes and Humorous Farm Stories

The 10-year-old daughter of a local veterinarian went into a drug store. She found no clerk at the soda water fountain, so wandered back to where the druggist was putting up prescriptions. The following dialogue followed:

"Can I do something for you?"

After quite a pause, "Do you make pregnancy tests for cows?", she asked.

"Yes."

"Do you make urine analysis?"

"Yes."

"Well then, would you mind washing your hands and getting me an ice cream cone?"

F. R. Carpenter,
Hayden, Colorado

★ ★ ★

Hard work never killed anybody but it has been known to scare some people half to death.

★ ★ ★

A New Hampshire farmer had been urged to attend the funeral of his neighbor's third wife.

"But I'm not goin'," he announced to his own wife.

"For goodness sakes, why not?" she asked.

"Well, Marthy," he replied, "I'm beginnin' to feel kinda awkward about goin' so often without anythin' of the sort to ask him back to."

—*Future*

★ ★ ★

"What kind of dog you got there, kid?" asked a passerby regarding the nondescript mongrel romping on the lawn with a young lad.

"He's a German police dog," replied the youngster proudly.

"He surely doesn't look like one," the stranger objected.

"Course not," said the little fellow disdainfully, "He's in the secret service."

★ ★ ★

The ability to speak in many languages is valuable, but the ability to keep your mouth shut in one is priceless.

★ ★ ★

A British naval lieutenant commanded his first ship—a frigate—during recent NATO maneuvers. He bumped into another vessel, causing only slight dam-

age but considerable confusion in the deployment of the fleet. The admiral commanding the operation signaled: "What do you propose to do now?"

The lieutenant's answering signal—seen by the whole fleet, and now on its way to becoming a naval legend—was: "Buy a small farm, sir."

Texas Future Farmer

★ ★ ★

Half of men's troubles are due to lack of business knowledge: Knowledge of what is their business, and what is none of their business.

★ ★ ★

"Grandpa," a farm boy asked, "is it going to rain tomorrow?"

"I just don't know, Sonny," Grandpa mused, gazing toward the setting sun. "Since the guv'-ment took over the weather, I can't seem to read the signs at all."

—The Furrow

★ ★ ★

A hillbilly just last week completed building a cabin for his new bride. He asked her, "Well, woman, how do you like your new home?"

She looked it over and said, "Not bad at all, husband; but I don't see no door . . ."

He eyed her quizzically for a moment and said, "Yew a-plannin' on a-goin' somewhere?"

—Butter-Fat

Two new boots were talking after lights-out one night. "That chief of ours," one said, "I never in my life heard a man talk so fast."

"No wonder," said his friend. "His father was an auctioneer and his mother was a woman."

—Arkansas Valley Journal

★ ★ ★

A bed is the only thing most people nowadays can comfortably retire on.

★ ★ ★

In the days of Tangelfoot fly paper, and no screens or sprays, my Grandmother lived beside a Horse Back (a long narrow ridge of sand and gravel). There was a river on the other side and a road ran along the top. She had an old cat who was one awful snoop.

Early one morning she put out some fly paper on the table and sideboard. She went out to do her chores, and as usual the cat jumped up on the table as soon as she left the room. Grandmother had forgotten something and went back after it. As she opened the door, the cat gave a big leap to get off the table, but landed all four feet on a sheet of fly paper.

He was going with such speed the paper skidded off the table. While in mid-air, a gust of wind came through the open door, caught up cat, paper and all,

carrying them out the open window, up the river, and out of sight.

The yowls that came from that poor old cat were frightening. Whether he drowned in the river, as he could not free himself from the paper if he fell in the water, was too scared to return, or what happened to him she never knew, but she never saw him again.

—Mrs. Herman Warman, Houlton, Maine, in American Agriculturist.

★ ★ ★

Sometimes when a father and son carry on a business together, the father really does the business and the son does the carrying on.

★ ★ ★

Looking around a western ranch, the city man was startled to discover a large pond with several bell-ringing buoys floating on its wind swept surface.

He exclaimed to the rancher: "I thought buoys were a navigational aid!"

"They are," replied the rancher. "That's why we have them. This is such a large ranch that the cows could never find the pond if they couldn't hear the bell ringing in those buoys."

"Oh, come now, you're pulling my leg, aren't you?"

"Pulling your leg?" the rancher said in a hurt tone. "Do you mean to tell me you never heard of cowbuoys?"

A chip on the shoulder indicates that there is wood higher up.

★ ★ ★

An Iowa farmer, on his first visit to the big city, stopped in a plush cocktail lounge and ordered a beer.

"How much beer do you sell a week?" he inquired.

"About 40 kegs," replied the bartender.

"I'll tell you how you can sell 80."

"Eighty kegs?" said the bartender, amazed. "How?"

"Simple," answered the farmer. "Fill up the glasses."

—The Lion

★ ★ ★

The trouble with glasses
Newly bi-focal,
You glance at what's distant
And whoops! it is local!

★ ★ ★

In a saloon in the wild west, guns were blazing and men were running in all directions for cover when a mild-looking man strolled in and leaned casually against the bar. In a little while all was quiet.

A stranger came up and congratulated the man on his perfect nerve control. "Oh, that's nothing," said the man with a smile. "I'm quite safe. You see, I owe money to everybody in the place."

How To Make Good Grass Silage

Wilting is recommended . . .

Condensed from Hoard's Dairyman

Gordon Barrington and
Robert Niedermeier,
University of Wisconsin

NO system of forage harvesting results in complete preservation of crop nutrients. Likewise, no system can make "good" feed out of "poor" feed.

Good silage begins with the crop. Both grass and legumes are more digestible and higher in protein in the early stages of growth. Alfalfa or alfalfa grass mixtures should be cut when the alfalfa is in the late bud or one-tenth bloom stage. Clovers should be cut by one-half bloom stage, and grasses before the headout.

Regardless of preservation, late cut forage or forage containing a lot of weeds and stubble won't make top quality silage.

In many sections of the country, haymaking conditions are poor when the first crop is ready. Therefore, many farmers use grass silage as a means of saving this first cutting. It has been shown that good grass silage can produce 25 to 30 per cent more milk per acre than rain-damaged field-cured hay.

Unfortunately, grass silage frequently is made as an afterthought, when it becomes apparent that the weather is not going to allow making hay. By this time the stage of growth is such we can't expect to make high-quality silage. To realize the value of silage, we must make it as part of the crop harvest plan rather than to make silage only as a means of salvaging the hay crop when all else fails.

Insure Fermentation . . .

To preserve legume-grass silage is more difficult than a crop like corn that is naturally high in fermentable material. Desirable fermentation is best encouraged by proper moisture, temperature, and compaction conditions within the silo. These conditions will promote the growth of the bacteria which produce good silage.

The acids produced by desirable fermentations stop the development of micro-organisms which cause spoilage. Forage preservation, therefore, depends upon an acid condition in the silage. Here are the methods

Reprinted by permission from Hoard's Dairyman, 28 Milwaukee Ave., Fort Atkinson, Wisconsin

which can be used to develop the desired acidity:

1. The addition of fermentable material at the time of ensiling is one method. Molasses and homegrown grains are exclusively used for this purpose. This results in added feed value because only a small per cent of the material added is used up in the fermentation process. The price and availability of molasses or grain will help decide if this method is practical.

2. Direct acidifiers also can be used to increase the acid content of silage. Over the years, both organic and inorganic acids such as hydrochloric acid and sulfuric acid have been used for direct acidification. These inorganic acids are very corrosive to equipment and never have been used extensively in the United States.

Recently, sodium metabisulfite has been used extensively as an acidifying agent. This material is a dry crystal similar to salt in appearance and is easy to handle and apply. The use of such a material will reduce the silage-making losses somewhat. It also may reduce the objectionable odor associated with high-moisture grass silage.

The reduction of feed losses usually will not pay for the cost of the preservative. However, many farmers feel the reduction of odor warrants the extra cost involved in the use of this material. This type of preservative does not add feed value, nor does it decrease seepage or run-off losses with high moisture silage.

3. Wilting offers a practical method of grass silage preservation. In addition, it reduces run-off losses that occur when direct-cut forage is ensiled (with or without preservatives). Many farmers are making satisfactory grass silage without the cost of added preservatives.

Wilting Necessary . . .

Several recent developments have tended to promote the use of high-moisture forage which currently makes wilting a more important consideration than ever. Farmers now have available, and like to use, direct-cut forage harvesting equipment.

Chemical preservatives now available reduce the objectionable odor associated with high-moisture silage. Presently, legume varieties are available that can stand pre-bloom cutting.

Feeding specialists recommend that farmers take advantage of the better quality feed which results from this earlier cutting. Care must be exercised if this quality is to be preserved.

Wilting is necessary, since at this early stage of growth, the moisture content of the crop may be as high as 86 per cent! Forage which contains this much

moisture will drain considerably when it is ensiled. This seepage can represent a very serious loss of feed.

The seepage from a silo will contain about 5 per cent dry matter. With 86 per cent moisture forage, as much as 40 per cent of the total weight of material ensiled may drain from the silo. This may carry with it 12 to 14 per cent of the dry matter ensiled.

If we allow this drainage loss to be added to the other losses which we cannot avoid, we may find that the total loss of feed value is greater than if we had made hay.

The drainage itself presents a problem in disposal. We may have a messy, ill-smelling lake of silage juice around the silo.

If the material ensiled is reduced in moisture to about 70 per cent, little or no seepage occurs. This is accomplished on a reasonably good drying day by cutting the material and allowing it to wilt in the swath two to three hours. The material is then raked. Immediately, it can be picked up and chopped with the forage harvester.

Requires More Field Work . . .

The procedure requires more field work than would be necessary with the direct-cut method. We can, however, mow and rake at higher speeds than are possible to obtain with the cutter bar attachment for the forage harvester. Also, we normally handle a seven-foot swath rather than the five-foot cut commonly used on the cutter bar attachment. The additional time in the field is not as great as it may appear to be.

Colostrum milk should form the sole diet for the first few days of a calf's life. Surplus colostrum milk may be stored at low temperature and fed for longer periods of time.

Some farmers report using a windrow attachment on the mower, thus avoiding the raking operation. This will save labor but will lengthen the time required to wilt the forage to the desired moisture level.

One of the objections farmers have to wilting is the difficulty in determining when the forage has reached the desired 70 per cent moisture level. But those farmers who have used the method report that they have no difficulty with this after a little experimenting.

It may be desirable to make a few tests at first. Your county agent should have information on methods to use to determine moisture content of crops. After a few tests, you should be able to make wilted grass silage just as you have learned to make hay.

When making wilted silage, should a load get too dry, a wet load can be put on top of the dry one. In general, a little drainage is desirable; it indicates silage is about 70 per cent moisture.

Ensiling material of 65 per cent moisture or less may cause losses due to molding and excessive heating. In most cases, material cut in the morning can be ensiled after noon. Material cut late in the afternoon can be picked up the following morning. Of course, this will depend on the weather.

Another advantage of the wilting method lies in the fact that the silage will have a lower moisture content than silage produced by the direct-cut method. Dairy cattle eat more dry matter when fed wilted silage. Feeding trials indicate wet, soggy silage results in a considerably reduced dry matter intake. In addition, wilting reduces fermentation losses and produces a better-smelling silage than the direct-cut without preservatives.

Some loss of dry matter will occur when making silage. This loss may vary from 3 to 10 per cent and is largely unavoidable in a conventional silo. It is due to the action of the bacteria which produce the acid which in turn preserves the rest of the material.

Spoilage on Surface . . .

Wherever the material is exposed to the air, we will have some loss due to spoilage. In the upright silo, this will occur at the top and near any doors which are not tightly fitted. Covers of plastic or waterproof paper will help, if they are properly used.

A news item says that something may be invented to take the place of money. It should come as no surprise to most of us to learn that money isn't here to stay.

After the silo is filled and leveled, it should be tramped to pack the material, particularly around the walls. It is also a good idea to finish filling with a couple of loads of unwilted material. This wetter material will pack better and thereby reduce top spoilage.

In the stack or trench silo, spoilage will occur over the whole exposed surface. These losses will be most severe with a stack, as a greater area is exposed than with the upright or trench silo. The losses can be reduced by proper packing of the material in the trench or stack. Covers also can be used on stacks or trenches.

These silos can be covered with materials such as straw, sawdust, soil, or crushed lime-

stone. Any material can be used that is cheap, will prevent air from reaching the forage, and will not be harmful to the animals, if some accidentally is mixed with the silage.

Short Cut Desirable . . .

Another factor which should be considered is the length the material is cut. Short cuts result in better packing, with less spoilage. If the material is well packed, the length of cut doesn't make much difference in the preservation of the silage. It will, however, affect the ease with which the silo can be unloaded. A theoretical length of cut of one-half inch or less is desirable for an upright silo. The theoretical length of cut is the cut for which the machine is set. The actual cut in hay crops will be about twice the theoretical cut.

Long cuts with conventional forage harvesters or material cut with the newer rotary harvesters tend to be difficult to remove from an upright silo. Certainly, if you are using a silo unloader, you should cut the material to one-half inch or less. If you are using a stack or trench where a front-end loader can be used, then you may find a long cut satisfactory. More packing will be necessary with the longer cut, if spoilage is to be reduced to a minimum. Grass silage is a method of preservation that can be profitably used, but unless care is exercised, losses can become excessive and the advantages of silage making over other methods of preservation are lost. So let's make *good* grass silage.

Free Access to Clean Water Will Up The Production of Milk

Cows that have free access to water produce up to 20 per cent more milk than cows watered only once a day, W. L. Northern, Extension dairyman at West Virginia University, reminded dairymen.

Dairy animals require about 300 pounds of water to make 100 gallons of milk. The average daily water consumption per cow is about 12-15 gallons. There is a definite relationship between the water intake and the milk output, particularly in the summer.

Body temperatures are higher in summer, which means that water needs are more pressing. Comfortable cows produce more milk, and one way to help them to be comfortable is to supply clean drinking water. Try to provide plenty of clean, fresh water to your dairy animals at all times, Northern urged.

—West Virginia University

Vertical Integration: How Would It Affect Your Farm?

Would a contract agreement be to your advantage?

Condensed from Iowa Farm Science

Lee Kolmer and *Laurel D. Loftsgard*

VERTICAL integration or so-called contract farming—except for personal preferences and desires—is mainly an economic consideration. At present, however, there's more emotion than common sense involved in trying to figure out which way to go on integrating the hog business.

To find out *if, where* and *how* vertical integration might fit into your farm operation, it's necessary to look at the combination of production you now have. Then consider how an integration arrangement might change that combination. This will give you some idea of whether or not you'd be better or worse off with such an arrangement.

It's Different . . .

Vertical integration is by no means new in America. But it's finding its way into new areas—right now, into agriculture.

Past experience with vertical integration in agriculture is limited. Until recently, it has been mainly confined to areas where soil productivity is relatively low or where farm operating capital is very scarce but where family labor is plentiful. In many of these situations, integration has provided needed credit, managerial help and other facilities to expand the farm business and to increase farm family incomes.

In the Midwest—where there are larger farms, better soils and better capital situations—integration presents entirely different problems. Judging the desirability and profitability of integrated hog production is much more complex for Corn Belt farmers—with relatively large amounts of capital and good soils—than it is for farmers operating with

Reprinted from Iowa Farm Science, Iowa State College, Ames, Iowa

very little capital on poor soils.

Several research studies have indicated the most profitable sequence for investing increasing amounts of operating capital in the farm business with highly productive soils. Starting with very little capital available, for example, and as more operating capital becomes available, the generally most profitable order in investing this capital is:

First, intensive row-crop production (usually corn) without fertilizer;

Insects in the United States cancel out the work of at least a million men each year.

Second, the same crop production but with increasing amounts of fertilizer;

Third, a hog enterprise as capital becomes available for it;

Fourth, feeder cattle and substitution of some meadow acres for corn acres to meet the increased forage needs of the feeder cattle; and

Fifth, a poultry laying flock largely managed by the homemaker.

There are, of course, exceptions to this sequence—depending on the managerial ability of the operator, his attitude toward risk, the opportunity for other enterprises such as dairying, the market outlets available, etc. Considering only the per-dollar returns on operating capital, however, crops, fertilizer, hogs, feeder cattle and poultry, in that order of investment, usually give the highest returns on capital invested.

But making a business out of farming calls for a deeper look into the farm's resources and the possible combinations of them. The highest possible total income always results from the most efficient use of management, labor, land and capital in combination.

Intensive crop production coupled with increasing hog numbers, soon begins to call for more labor than is available from the farm family. Because labor is scarce, adding more operating capital at this point calls for investing it in the kinds of production giving the highest returns to labor. With average hog and beef prices, adding capital in the form of feeder cattle gives higher returns to labor than would additional hogs. After labor has been profitably allocated among crops, hogs and feeder cattle, some increase in income usually comes by adding a laying flock—if the homemaker has the time to work with them so as not to reduce the labor available to the other operations.

The relative profitability of all of the different enterprises must be considered together with the new possibilities that integra-

tion might bring before you can judge realistically whether integration might be "good" or "bad" for you.

Aside from profits as such, individual farm operators have different attitudes toward various enterprises and the degrees of risk associated with them. To lessen the risk of "putting all his eggs in one basket," an operator often diversifies his operations. For example, an operator really short on capital might get the highest returns by concentrating on crop production alone. Yet he still may keep some hogs even though it leaves him less time for crop production. A combination of crops and hogs is his way of reducing risk by safeguarding against a crop failure. Your own attitude toward the risks associated with different enterprises is an important consideration in finding out whether or not an integration arrangement might fit into your farm business.

Adds "Bundle" . . .

Contract farming or vertical integration has the effect of bringing a new "bundle" of resources into a farm operation planning process. It may provide capital in the form of feed credit, breeding stock and underwriters bank loans. It may provide additional management, less price uncertainty and new market outlets. Any one of these factors changes the resource situation or planning alternatives for the individual farm.

Fires, many set on purpose, burn some 6 million acres of southern forests yearly.

Vertical integration adds both new production resources and new production possibilities to the farm. This calls for an examination of how and why this will affect costs, the labor load, the volume of livestock production, the management requirements and the expected returns.

Let's look first at some of the possible effects of adding capital to the farm business.

Adding Capital:

Many farm operators have suffered in one way or another from a lack of capital. The most severe cases occur when an operator can't get sufficient credit to efficiently use the other resources available on the farm. And, for these situations, outside sources of capital provide a welcome way of expanding the farm business.

Outside sources of capital or credit may come in several forms. Some may take the form of feed credit (available from the time the sows are bred until the market hogs are sold). Others may take the form of leased breeding stock, with the producer simply

paying a charge for use of the stock.

Feed suppliers or processors may also be instrumental in making more credit available to a producer through regular lending institutions. That is, a banker may be willing to lend additional money to an operator who undertakes a supervised hog program and some market premium.

A woman's worries begin when her curves change to contours.

But new capital from any of these sources creates new decisions for the operator. This is because the new capital, in the form of credit, may be combined in several ways with the capital he already has. Thus, he's faced with a completely new set of production decisions.

First, additional credit **costs** money. The operator must decide if the interest rates on the new capital he can tap are the best rates available for his situation and circumstances. If they are, he must decide further:

—whether or not to tap this "new" credit supply to the full extent;

—whether or not to keep his own funds in hogs or to invest them in some other enterprise in case the added credit is available only for hog production;

—whether or not the expected returns from increased production will be high enough to offset the actual cost of the outside capital. And, here, it's also necessary to consider again individual attitudes toward risk in producing more hogs or beef cattle.

Using the Capital:

How an operator decides to use the added capital will very likely determine the livestock program on his farm. Under a contract agreement, the added money or credit usually is specified for hog production. But the added capital can result in increased beef production rather than increased hog production. This happens when capital already on the farm is shifted out of hogs to the next most profitable enterprise — feeder cattle. And the result is an increase in beef production with little or no increase in hogs.

If, on the other hand, the operator's own capital (used previously for feed and breeding stock) is shifted into increased *facilities* for hogs since new feed and breeding stock credit has been made available from a supplier, the result is likely to be increased hog production.

But notice, in either case, that the result is an increase in livestock production. This would often be of advantage to the individual producer **because** it

would raise his income. But if total output, through the activities of many producers, is raised to the extent that prices are depressed, the action could be detrimental.

A "good deal" for one operator, however, may not be the same for his neighbor. Some farmers consider the added risk of expanding their hog operations on borrowed capital as too great, regardless of the interest rate. They'd accept a lower income rather than bring additional borrowed capital into their farm business. Other farmers, with considerably *more* capital, would *still* be interested in *any* source of additional credit (at competitive interest rates) to use in expanding their livestock operations.

In the first instance, some of the operators might have much less capital than they could profitably use in their operations. In the second instance, the operators may expect the added profits possible by the use of more credit to more than offset the cost of the credit.

Less Price Risk?

Some farmers limit the size of an enterprise because of the risk of wide swings in selling prices. For these farmers, contract farming has little attraction unless the selling price uncertainty is substantially reduced.

Price uncertainty can be reduced in several ways. A selling price may be specified before the product is produced. Or a set premium may be agreed upon for a specified quality over the "average" or "top" market price at the time of sale. When the selling price is set in advance, price uncertainty is reduced to zero. A producer knows exactly what his selling price will be. The only remaining uncertainty is whether or not he can produce the product at a cost lower than the agreed price.

An estimated 40 per cent of turkey deaths are attributed to improper management.

In the swine and egg contracts now in effect, no specified price is agreed upon in advance. Rather, a price level is agreed upon. This level usually is set at a certain "premium" above the "average" or "top" market price at the time of sale.

This kind of price agreement *may* or *may not* reduce price uncertainty. If the "premium" set for a specified quality is higher than the open-market price for the *same* quality, then there's some reduction in price uncertainty; the producer then knows that his selling price will be higher than the open-market price. If, however, the so-called premium is a quality payment also

available from other buyers, there's *neither* a reduction in price uncertainty nor a price advantage to the producer.

The dressing percentage required and the base price are important factors concerning price uncertainty in the hog business. If the base is determined by a "high-low average" of market prices for No. 1, 2 and 3 hogs, it will be lower than a base price set at the "practical packer top" level. In this case a producer has a higher net return only if the premium above a "high-low average" price is larger than the premium above the "packer top."

The so-called premium may reduce selling price uncertainty, but income will still vary. That is, income will still go up and down, depending on the price level, just as it always has done. But the low and high points of the income cycle will be at somewhat higher levels.

If the arrangements can remove some of the price risk, some farmers who now limit their hog production because of the wide swings in hog prices will be willing to use more credit to expand their hog business. And if this happens, we can expect "hog contracts" to increase hog production.

More Management:

Many farmers curb their livestock production because of a capital shortage or their dislike for risk. Others limit livestock production because of a lack of managerial ability. A producer, for example, may limit his hog production to 10 sows if he thinks he can't do a good job of handling more hogs.

Many bridges built by the Romans before the birth of Christ are still in daily use in various parts of Europe.

Feed suppliers may include some management services with a contract agreement — such as help in formulating rations and recommendations on sanitation, breeding, housing and equipment. If this added advice is both worthwhile and accepted, it will tend to increase hog production on a "contract" farm.

As with credit, however, no one group of individuals or companies has a monopoly on management services. And the kinds of management services included under current contracts are also available from other sources — such as the commercial farm management companies, nonintegrating feed companies and the state colleges of agriculture. This means that farm operators who merely wish to improve their production practices needn't enter a contract solely for this purpose

to get the help and information they want.

Farm Organization:

We've pointed out that expanding the hog business can result in a decrease in beef production. This can happen when all farm-produced feed already is being processed through livestock. Additional hog production, in this case, will call for more acres of corn and fewer acres of meadow. This result may be less beef production on the more productive soils where meadow crops aren't needed to prevent erosion or the loss of soil fertility.

A gentleman farmer is a feller who has more hay in the bank than in the barn.

So the operator is faced with another set of decisions. He must balance the labor requirements for hogs and beef cattle to help decide which to expand. If the present hog program uses all of the available labor, for example, expanding beef usually gives greater returns to labor than expanding hogs.

The expected selling prices of beef and hogs must also be considered. It wouldn't make much sense to expand hogs should the price prospects for beef look better in the next few years.

Agriculture buys enough raw rubber to put tires on nearly 6 million cars a year.

The type of farming area is a factor, too. Highly erosive soils need meadow and hay crops. And these crops are most profitably marketed through beef cattle. Hog contracts, here, would likely increase hog production by supplying off-farm feed and not affect the size of the beef operation. On fairly level soils, however, hog contracts will tend to stimulate more acres of corn because the corn can readily be processed through hogs. Here again, the managerial decisions involve a comparison of one livestock combination against another.

Soil Compaction With Irrigation

Contrary to what we might guess, pasture irrigation does not cause greater soil compaction. Lee Gard, station researcher at the University of Illinois, took soil compaction samples at several depths on both irrigated and non-irrigated pastures and found very little difference between the two. Lee feels that animals grazing wet pastures will cause soil compaction, but that natural rainfall is a greater factor and that irrigation adds little to the problem.

—Dixon Springs

Chimney Smoke

by Irene Rudie

What one approves, another scorns,
And thus his nature each discloses:
You find the rosebush full of thorns,
I find the thornbush full of roses.
—Author unknown.

A prepared fruit soup is now on the market. I haven't tried it, but the Scandinavians in our neighborhood made one of the first, sour apples. Slice green apples thin, including the skin, and boil with oatmeal and raisins. Add cream and serve for supper.

★ ★ ★

Scientists have found that a starvation diet increases the chance for a long life, and that living in a temperature of 63 degrees F. is conducive to longevity. Do they call starving in a cold house living? A neighbor was told by her doctor to give up meat or her chances for life were slim. She said she preferred death to life without meat and lived to be 84!

★ ★ ★

Leave it to the beginners in language to find the most descriptive words. One little tike called her bib a "necktie," and a paper napkin was a "page."

Magazine articles on home decorating are forever suggesting how to make a small room look larger, a large one smaller, a narrow one wider, etc. I wonder whether any of them ever find a room exactly right, and what its dimensions would be.

★ ★ ★

"Let's go home, it's getting late," said one card player to his partner in town one day. The partner pulled out his watch, and after a careful examination, announced, "Well, it's too late now to get home early, and if we're staying late, we have lots of time."

★ ★ ★

A flutter of colored auction bills on the creamery billboard is the first sign of fall.

★ ★ ★

It's a wise man who knows his way around his own house after a few days of housecleaning.

Making Best Use of Poor Quality Roughages

Poor quality roughages are always a problem on the dairy farm. This article tells how to use them to the best advantage . . .

Condensed from Guernsey Breeders' Journal

C. M. Chance & S. T. Slack, Cornell University

FARMERS were faced with a large supply of poor quality roughages for winter feeding last year. Milk production was undoubtedly lower as a result.

Faced with this problem, the individual farmer had the choice of using roughages on hand or buying substitutes as described below:

1. Using the roughage on hand.

a. *Frequent Feeding.* More frequent feeding of small quantities of roughage will stimulate the cows to consume a greater dry matter intake than they would if provided roughage in the usual twice-a-day feeding regime.

b. *Liberal Feeding.* If it is not feasible to feed roughage more often than the usual regime, provide a liberal supply at each feeding so that cows may select the more palatable portions.

Do not force cows to eat all of the poor-quality roughage placed before them. The more stemmy material should be used as bedding.

c. *Selective Feeding.* In many cases, dairymen will have some good-quality roughage harvested early without weather damage. This good quality roughage should be fed to the high-producing cows and dry cows should receive the low-quality roughage when there is a limited supply of good-quality roughage.

d. *Molasses,* two to four lbs. diluted one-half with water, sprinkled on poor quality roughages will stimulate their consumption. Farmers receive a double benefit from molasses in that a greater consumption of roughage can be effected and less grain is needed to supplement the roughage.

Example: A farmer has mixed hay valued at $20, silage at $7.50, grain at $66 and molasses at $40

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per ton. He has a herd that averages 1,200 lbs. body weight and produces 40 lbs. of 3.5 per cent milk daily.

The following quantities of feed are adequate to meet the daily requirements for maintenance and production for the situation above:

12 lbs. hay	$0.12
30 lbs. silage	0.10
16 lbs. grain	0.53
	$0.75
18 lbs. hay	$0.18
2 lbs. molasses	0.04
30 lbs. silage	0.10
11 lbs. grain	0.36
	$0.68

A $.07 difference in cost per day per cow results. This amounts to $2.10 per day for a 30-cow dairy or $63.00 for the month.

Out of pocket cost is a difference of $0.13, or the difference between the cost of 16 lbs. of grain and 11 lbs. of grain plus two lbs. of molasses per cow per day. A difference of $3.90 per day for a 30-cow dairy daily or $117 for the month.

2. Roughage substitutes

a. *Purchased hay.* Nutrients in good quality hay can be purchased at a cheaper cost than an equivalent of nutrients in grain. In cases of necessity, farmers can afford to pay approximately one-half to two-thirds the price of a ton of grain for good hay. It is important to know the date of harvesting, content of legumes, leafiness and brightness for any purchased hay. Early-cut hay is more valuable than late-cut hay.

The following table shows the upper limit one should pay for different qualities of hay in relation to the price per ton:

	Price of Grain per Ton			
Quality of hay	$50	$60	$70	$80
	Value of Hay per Ton			
Excellent	33	40	46	53
Good	30	36	42	48
Fair	25	30	35	40
Poor	20	24	28	32

b. *Pulps.* Citrus or beet pulp can be used to increase total feed intake; i.e., TDN, but should be purchased in relation to cost of TDN from other feed sources such as hay or grain ingredients.

1. Citrus pulp contains ap-

High pressure air conveyors for grains and mixed feeds may be another new development in farm materials handling techniques if research at University of Illinois can be translated into production equipment. One advantage of the pnuematic system over conventional systems is the simplicity of its construction. One of the drawbacks is the greater power required to blow the products through tubing as opposed to augering, flighting or belting as employed in mechanical systems. Power cost is offset, however, by simplicity and convenience according to project engineers.

proximately 75 lbs. TDN and 2.7 lbs. digestible protein per 100 pounds. Citrus pulp has been equal in feeding value to beet pulp when replacing part of the concentrate mixture.

2. Beet pulp is very similar in composition to citrus pulp and contains 68.7 lbs. TDN and 4.1 lbs. of digestible protein. Experiments show that it is fully equal to corn or oats as part of the concentrate mixture.

When silage or other succulent feed is not available, dried beet pulp, soaked before feeding, can be used as a substitute for silage. It is succulent and appetizing which tends to increase consumption of less palatable feeds. A pound of beet pulp will take up approximately nine pounds of water on soaking, therefore, wet beet pulp is lower in dry matter than corn silage and requires approximately two pounds to replace one pound of corn silage.

c. *Molasses.* Cane molasses or blackstrap supplies approximately 54 lbs. TDN per 100 pounds. Much of this energy is in the form of sugars and easily digested. On a TDN basis, one pound of molasses is equal to one pound of good hay or two-thirds the value of a pound of corn grain. Molasses contains no digestible protein, therefore, ample protein must be supplied by the rest of the ration when large amounts of molasses are fed.

d. *Grain.* Occasionally farmers find grain provides nutrients at a lower cost per 100 pounds of TDN than roughage.

These facts may help to solve the poor quality roughage problem in future years.

Balanced Fertilizer Best

Nitrogen returns the biggest profits to the farmer when his soil is well supplied with the other plant food nutrients—phosphate, potash, and lime—reports Dr. A. C. Caldwell, University of Minnesota soils specialist.

Caldwell points out soils can vary in their need for individual nutrients.

"In tests with corn on land low in potash, for example, adding high-potash fertilizer gave a big yield increase," he says.

"In a second set of experiments, phosphate was the most needed nutrient and in still another trial, nitrogen was the limiting plant food nutrient.

"Yet in all these tests, a balanced fertilizer containing nitrogen, phosphate, and potash gave the best corn yields."

—*Minnesota Extension*

Gibberellic Acid Shows Promise

A growth stimulating chemical speeds germination and maturity . . .

Condensed from Wallace's Farmer

LOTS of interest is being shown in the amazing new plant-growth booster, gibberellic acid.

Experimental results look good on most crops, but the cost may be too high for large-scale use right now.

This growth stimulating chemical isn't brand new. First notice of the chemical came over 30 years ago in Japan.

Little research was conducted until recently, however, and there are still many things to learn about gibberellic acid.

No one is positive yet just how the chemical works although research is being carried on now. Probably, the extra growth is produced thru cell elongation and cell division.

Anyway, it's certain that plants treated with small amounts of gibberellic acid will grow at a much faster rate.

Here are some observations on gibberellins from a group of experiments:

1. Plants grow faster. Most obvious effect is a lengthening of the stem and an increase in dry weights.
2. Accelerates germination of seeds.
3. Speeds plant maturity.
4. Helps keep bluegrass growing during the late summer.
5. Protein content of a plant may be improved when fertilizer is combined with the gibberellic acid.

There is no evidence yet that gibberellin has any harmful effects, says a Michigan State University scientist.

Gibberellin applied to plants is absorbed in the plants. Also, tests thus far have shown that the chemical has no toxic effect on animals.

In fact, one chemical firm has experimented with gibberellic acid as a feed additive. In one 63-day test, one gram of the substance was fed per ton of ration, improving gains on wether lambs by 13 per cent.

Reprinted by permission from Wallace's Farmer, 1912 Grand Avenue, Des Moines 5, Iowa

Surprisingly enough, gibberellic acid can act as a growth regulator on some plants. Sugar beets are one example.

The chemical helps prevent "bolting" of sugar beet plants. (This is when the plants stop producing leafy growth and rapidly send up a tall seed stalk.) Gibberellins won't affect all plants the same.

Many people have the right aim in life, but too few pull the trigger.

Gibberellic acid may not always affect field crops in a desirable manner. For example, treated crops such as wheat, oats, and soybeans may become too tall and have greater tendencies to lodge or fall over.

Most extensive tests to date with gibberellic acid have been made with vegetable and flower crops.

Indications are that yield won't be greatly affected with grain crops. Most of the effect comes in faster germination of seed and faster growing seedlings.

Like grass, corn may start growing earlier in the spring and develop faster.

Root growth, in many tests, has been slowed by the application of gibberellic acid. So it has little value for carrots or other root crops.

When gibberellic acid was sprayed on well-fertilized bluegrass sod in Michigan tests, a speedup in growth was noticed in 3 days. After 11 days, it had grown about 3 times more than the untreated grass.

However, when these bluegrass samples were dried and weighed, dry matter content was almost the same for the treated as for the untreated grass.

Some other advantages may be offered by gibberellic acid after we gain more intensive research.

Treating the seed with this chemical may be a good way of getting a head start on weeds. Also, long season crops could be started earlier, and could be grown in regions farther north.

How does this growth-stimulating chemical affect weeds? It will speed growth. Tests were conducted to see if weedicides would be more effective after a patch of weeds was given a shot of gibberellic acid.

Reaction was the same for treated and untreated weeds, so the stimulated growth does not make a weed more susceptible to chemical killers.

Right now, cost of gibberellic acid is too high for large-scale use.

"Present wholesale price is about $112 an ounce, and this is prohibitive even for a garden," says R. E. Nyland, University of Minnesota horticulturist.

You can buy a 12-ounce aerosol preparation for about $3. This contains 20 mg. of gibberellic acid, which is enough to treat a large number of house plants.

First commercial use of the chemical may be in the grape vineyards in California. Early tests on this crop show an increase in both size of grapes and clusters when gibberellic acid is applied.

The future of gibberellic acid does look good. A lot of research is needed, however, before farmers will know exactly what advantages this plant-growth booster offers them.

More Effects of Gibberellic Acid Noted

Two more effects of gibberellic acid on plants have been noted by scientists at the University of Minnesota. They have found that this so-called "wonder" chemical—known to stimulate growth—causes a plant both to take up more phosphorus and to lose water more rapidly.

The findings come from botanists A. J. Linck and T. W. Sudia. In one test, they put bean plant roots in gibberellic acid solutions, added radioactive phosphorus (P-32) and checked plants 28, 52 and 76 hours later with a Geiger counter.

In all cases, plants treated with the chemical had absorbed more phosphorus than non-treated ones. Gibberellic acid also affected the phosphorus distribution; after 76 hours, for example, upper stems of treated plants had four times as much phosphorus as non-treated ones. In new leaves, though, gibberellic acid only doubled the amount of phosphorus.

Another experiment showed that plants treated with the material lost more water than untreated ones. Just how these findings may be used in the future is still a question. Linck and Sudia say it would take many more tests to tell whether gibberellic acid can be used to speed up fertilizer use. But both findings give the scientists important clues on what goes on inside the plant.

Gibberellic acid causes spectacular growth increases in some plants, mostly by causing plant cells to grow longer. In the Minnesota tests, treated beans grew much higher than untreated ones. Scientists around the country have found the material has a variety of effects, but there's conflicting evidence on whether it increases yields.

University horticulturists in 1957 found it increased growth but failed to make tomatoes or peas yield more. It actually stunted potato growth. —*Minnesota Research Report*

Can You Stay In Farming?

Is agriculture's biggest surplus too many small farmers?

Condensed from Farm Management

Dr. Ivan L. Corbridge and *Dr. Glenn T. Nelson,*
Brigham Young University

FARM population has declined from 32 million in 1910 (34% of the population) to less than 20 million today (less than 12% of the population). This trend is expected to continue up to about 1975 when about 7% of our population will be farmers.

In spite of this reduction in number of farmers, agricultural output has continued to increase. Fifty years ago, each farmer raised enough for himself and six others. Today he produces enough for himself and 23 others. Never before has so much abundance been produced by so few.

Farmers consequently find themselves in a dilemma. The number of farmers is decreasing; yet total production is increasing. Actually, this is good. Fewer people will be bound to the task of producing our domestic needs of food and fiber; more will be freed to produce other goods and render other needed services. There is no limit to the potential outlets for productive capacity.

Human wants can never be fully satisfied. One of the reasons for lower standards of living in other countries is that the majority of their people are confined to producing their basic agricultural needs.

Help Evolution?

Should not the least efficient farmers be encouraged and helped in making this shift away from the farm if they can make a better living doing something else? Of course this adjustment is a difficult one. Other jobs must be available; the farmer or his son must be trained to do these jobs; communities and markets have to be readjusted.

For the next 10-15 years, surpluses rather than shortages are likely to continue a major problem. As many as 25% of our marginal farmers could be withdrawn from agriculture without hurting our productive capacity, provided the remaining farm units were efficiently operated.

Reprinted by permission from Farm Management, 4511 Produce Plaza, Los Angeles 58, Calif.

The social adjustments in making such shifts are tremendous. Farm families cannot be shipped hither and yon to the highest bidder as can sacks of potatoes. Change and growth are often painful. The channels of transfer, however, ought not to be dammed-up but to be greased-up. The movement out of agriculture is an unavoidable adjustment that has been going on for decades and will continue.

Politics can neither stop nor reverse this trend, only delay and confuse it. In the final analysis, the economic forces working in this process will be overwhelming. Both the farmer and society will benefit. It is not a question of "should" but "how much and how fast."

Capital Requirements

Farmers are keenly aware of the staggering capital requirements of modern farming. The national average value of all productive assets per farm in 1958 was about $30,000. Since 56% of the total number of farms have annual sales of only $2,500 or less, balance of the farms—which really produce the bulk of our needs—obviously require a capital investment far in excess of the above average figure. Many farms have capital assets in excess of $100,000. The average person working in agriculture today is working with far more fixed capital than the average non-farm worker.

This does not mean that a farmer will have to be an "agricultural tycoon" but does mean that he must increasingly learn to live in debt and to farm with borrowed money. Capital is a major resource. Like other resources, it should be used as long as its additional returns are greater than its additional cost (interest).

Adjusting to Changes

The future well-being of a farmer will largely be measured by the degree in which he meets the challenge of agricultural change. No longer can a man resort to farming if he fails at everything else. Rather, any man lacking in the numerous skills required in modern farming, failing to use good management and technology or having inadequate productive resources had better seek employment elsewhere.

Traditionally, a farm has had to be refinanced every new generation as the farm son bought out the other heirs or financed the full purchase. This has meant that the family skimped on family spending in order to meet the mortgage payment. This has been a severe forced saving program in which the farmer lived poor in order to die rich.

We are now entering a period

in which a smaller share of farm earnings is likely to be devoted to capital accumulation and a greater share for family living. Fewer farm people will be willing to spend 40 years of reduced living standards in order to own their own farms. More will be satisfied to rent at least part of the farm unit and/or enter into some type of financial agreement wherein a third party will put up some of the capital even on a permanent basis.

Family Partnerships

A further extension of family partnerships and corporations is very likely. These permit the economies of continued and unified operations from one individual or family. The new tax law wherein a family corporation can be taxed as a partnership promises far reaching effects for the farm.

Specialization of production rather than diversification is another way of economizing required machinery. If machines are used but a few days or weeks, it may be advisable to rent the machinery or hire the work done on a custom basis.

Farms not large enough to justify their own processing equipment will be able to save by having off-farm processors perform these services for them.

Integration

Farming is one of the few businesses that normally must sell its products on the wholesale market yet buy its productive materials at retail prices. Furthermore, it is the only major industry that must make its investment and production plans without knowing in advance the exact amount which will be produced that season and the approximate price which can be expected for the products. Farmers proceed on the hope that someone will be ready to pay a reasonable price for what is produced.

Agronomists say five pounds of Empire birdsfoot trefoil and three pounds of timothy seed an acre make a bloat-free, permanent pasture. Frost seedings may be made in February or the seed may be sown in spring oats in March and April.

Contract farming will be more widely used wherein farmers will produce, by contract, in a specific way for a specific market. This will take away from the farmer some of his decision-making powers but will at the same time enhance his market possibilities and reduce some of his risks.

Many view the declining farm population with serious misgivings and predict the end of the family farm. Is this more emo-

tional fiction than fact?

Family Business Farm

Size can be measured in such terms as acres, units of output, capital required, labor inputs or profit earned. A 50-acre farm can be increased significantly in "size" by better management, better and more intensive use of resources. A 10-acre berry farm may possibly be a much larger farm business than a 1,000-acre wheat farm.

What is a family farm? Any definition is purely arbitrary. Surely a farm in which the family unit provides the basic management and a large portion of the labor is just as much a family farm as one in which all the required capital comes from savings and all work is provided from within the family.

Holding Its Own

The family farm is holding its own. But this does not mean it should not change in make-up. Once we freeze anything into a rigid pattern of the past, growth and progress tend to cease. Growth and change are usually inseparable companions.

According to the last agricultural census, family farms have grown larger and their average volume of business has increased. The proportion of family farms, however, is still about the same as in 1940. The well-managed family farm, large enough to enjoy some of the advantages of size yet small enough to allow close attention to details, is likely to continue as the dominant form of farm business.

Round Silo Caps, made of polyethylene film, are a new twist in silo coverings. They're designed to protect silage in permanent upright silos, and come in sizes from 12 to 24 ft. across. These weather-resistant covers insulate silage from moisture and temperature extremes and aid in the ensiling process, says the manufacturer.
—Farm and Ranch.

Part-time farms, on the other hand, are increasing in number as ever more people are supplementing their incomes with outside employment—even to the extent of relying on non-farm employment as their major source of income.

Commercial farms, generally, are increasing in size, but so-called large scale farms were relatively no more numerous in 1954 than in 1930.

The above trends are only in response to basic economic pressures forcing more efficient operations. More expensive machinery and labor necessitate intensive use of these important resources. This may be accomplished by either adding more acres or balancing and intensi-

fying the other productive resources used on the existing acres.

Weeds reduce yields even more than formerly thought, especially at high yield levels. Kill them easily when they're small, with machinery and chemicals. —Farm Facts.

Small and large farms are likely to continue to exist side by side. However, the trend toward better managed and often larger units is undoubtedly to continue. A commercial business cannot afford to employ a man doing only half a job. Similarly, ill-managed and inefficient farm units cannot continue to justify themselves.

The "right size" farm will not be the same for all areas or for all managers. Some men are only capable of handling a small unit. Statistical evidence, however, is overwhelmingly in support of the fact that we are more out of balance in having "too many and too small" than "too few and too large."

Legislative Boomerang

Decreasing number of farmers, increasing capital requirements and increasing farm size are currents underlying the farm scene. Surpluses and relatively depressed farm prices are likely to continue to be the rule rather than the exception for the next 15 years. Any legislative subsidy, however, to perpetuate inefficiencies in farming will boomerang to the ultimate detriment of farmers themselves.

All these changes emphasize the increasing premium upon good management. Unfortunately, this is a resource that cannot be willed from father to son. Development of management equal to the task is a challenge of the future. Like Alice in Wonderland, "we must run as fast as we can to merely stand still."

Pellets Still Best

Pelleted hay is still king over wafers and baled hay. Hay similar to that fed as wafers and as bales was ground and pelleted. This product produced average daily gains of about 1½ pounds with the average daily consumption up to more than 16 pounds. It took only 1,100 pounds of pelleted hay to make 100 pounds of calf gain. About 1,600 pounds of wafers were needed to give the same gain while calves on the baled hay needed about 3,600 pounds of hay for each 100 pounds of gain.

—Illinois Agricultural Extension Service

Balance Your Rations

Poorly balanced animal diets cost farmers $100 million annually . . .

Condensed from Prairie Farmer

Keats Vining

IT is hard to believe, but American farmers lose over $100 million a year as a result of nutritional diseases in livestock.

Most of these diseases are caused by deficiencies or imbalances of certain key elements in rations. Actual losses come mainly from reduced gains, a drop in milk production, blindness, and birth of weak or blind young, rather than deaths. Nutritional diseases can cause deaths, however.

The problem is so great that special attention is being given to it by many state and national livestock organizations.

The average livestock producer cannot know all the nutritional problems that may develop in his animals. He can be familiar with the more common ones and be alert to their presence, but a veterinarian should always be consulted.

Ketosis is a disease associated with calving time and is more common in high-producing dairy cows. It generally strikes after the second freshening period. It occurs within a few weeks of calving and is believed to be the result of the great stress to which high-producing cows are subject.

Onset of Ketosis

The farmer should look for loss of appetite, high excitability, or indifference, loss of weight, reduced milk production, and a slight paralysis.

There is no set rule for prevention. Watch for any disease, injury, exposure, or disturbance that might subject the animal to unnecessary stress. Watch the diet for the right kind of feed for body maintenance and milk production. Stimulate the appetite by feeding high-quality roughages.

Milk fever is another familiar nutritional disease. Its cause is a rapid drop in the calcium content of the blood. With prompt attention there are few losses from death.

Cows four to eight years old

Reprinted by permission from Prairie Farmer, 1230 Washington Boulevard, Chicago 7, Illinois

seem most susceptible, with trouble occurring 12 to 72 hours after calving. Early symptoms may include dullness and reluctance to move, or excitement and spasms of the hind legs. Unconsciousness and labored breathing are signs of the later stages. There is no fever.

Udder inflation is a mechanical trick which prevents further draining of calcium from the blood. Delayed or partial milking helps some cows but has a reverse action in others.

A dose of calcium right after calving has some benefit to cows having a previous milk fever record. In herds where this trouble is prevalent, feeding a low-calcium diet reduced trouble with no effect on production.

Sheep have more than their share of nutritional troubles. Enteritoxemia in sheep is also called overeating disease. Heavy consumption of rich rations by suckling or feeder lambs presents an ideal condition for bacteria, present in the digestive tract, to multiply and release a toxin in the blood stream. How this is done is not known. Mature animals are not susceptible to this trouble.

The largest, greediest, and thriftiest lambs in a flock are usually affected. Sudden deaths of these lambs may be the first sign of the disease. Other lambs may develop symptoms such as running in circles, holding the head back or to one side, and pushing against a fixed object.

Management and feeding practices will help on control. Reduce grain rations and take ewes off lush pastures when lambs develop the trouble. An antitoxin gives immunity that lasts from two to three weeks.

U. S. farm people are less than 1 per cent of the world's population. But they produce one-fifth (20%) of the world's output of red meat and nearly one-third of the world's milk.

Pregnancy disease or ovin ketosis of ewes causes numerous deaths. It is likely to affect ewes carrying twins or triplets and is most common during the winter or early confinement period.

Symptoms include loss of appetite and dullness. Affected ewes stay away from the rest of the flock. Other signs are weakness, stiff gait, circling, pushing against fixed objects, frequent urination and, in late stages, coma.

Control methods are preventive. Ewes should be fed heavily on a balanced ration during the last two months of pregnancy. This may be a good pasture or liberal amounts of good-quality legume hay, either alfalfa or clover. Grain rations should be not less than one-half pound a day and increased to one pound

towards the end of pregnancy.

White muscle disease, often called stiff lamb disease, can affect both lambs and calves. It is believed to be caused by a deficiency of vitamin E. Deaths can run as high as 100 per cent. It is believed that simple starvation, and not the disease itself, is the direct cause of death in these cases. The trouble seems to be worse in western irrigated areas.

The degeneration of muscles, or muscular dystrophy, makes the lambs unable to get their feed. Lambs under two months old are the most commonly affected.

Symptoms include stiffness of the hind quarters, which gets worse, an arched back, and trouble in swallowing food, followed by prostration. In some cases it resembles pneumonia or arthritis. A veterinarian is needed to determine the exact cause and prescribe proper treatment.

Lambs three to four weeks old and calves four to six weeks old are most commonly affected. No one breed is more susceptible than others. The causes are not understood.

Rations deficient in vitamin E can cause a condition similar to white muscle disease, but adding the vitamin to rations didn't give control or satisfaction.

Swine have their share of nutritional disease problems. Nearly one-third of all pigs born each year die from various disorders and hazards. Not all deaths are due to disease in strict sense.

Nutrition and management during gestation and lactation periods were studied at the Beltsville Agricultural Research Center. Results show that pig losses are of various forms. Poor quarters, care, and unfavorable weather can nullify good nutrition. Poor nutrition can nullify good management.

Broadcast applications of fertilizer on land intended for corn before plowing may increase net profit more than the use of row fertilizer, agronomists assert.

Enteric (digestive) disorders are the predominating group of small pig diseases. They are many. Nutritional deficiencies and unbalanced rations usually cause diarrhea. However, sanitation, quality of feed, manner of feeding, and the standard of nursing are all factors.

Improvement of such factors can do much to clear up disorders. Vitamins, mineral supplements, antibiotics, and other medicinal materials are remedies.

Anemia and Diet

Anemia in pigs was a hazard until it was found that iron and copper deficiencies caused the

trouble. Neglect in adding supplements of these two elements could result in the development of weak and unthrifty pigs. Directly or indirectly this neglect can cause death.

Another pig disorder is goiter or hairlessness due to iodine deficiency. General use of iodized salt in mineral mixtures has made a marked improvement in this trouble. The Great Lakes area has most of the swine goiter problems.

Uremic poisoning causes runtiness or death in young pigs. It seems to have some connection with amount and quantity of the milk pigs get by nursing. This trouble is sporadic and unpredictable.

Hypoglycemia affects young pigs from one to three days after birth. The blood sugar in affected pigs is lower than in healthy pigs. It indicates some disarrangement of the carbohydrate metabolism.

Symptoms are sluggishness and failure to nurse. Injections of sugar in early stages or feeding their milk by a bottle or medicine dropper will help overcome the trouble.

Leptospirosis One of Main Causes of Abortion

Leptospirosis is believed to be one of the main causes of abortion in cattle, sheep and swine. Dr. L. E. Hanson of the University of Illinois College of Veterinary Medicine says that it may attack nearly all farm animals of any age at any time.

Although leptospirosis of cattle was not recognized before 1936, the disease is now known to be widespread. Livestock owners may not realize that their animals are infected with leptospirosis. Often healthly-appearing animals may be carriers and spread the disease to other farm animals through their urine. They may also pass it on to people in this way.

The most costly effect of leptospirosis in cattle and swine is abortion. Dr. Hanson advises livestock owners to call a veterinarian if any of their animals develop a fever, refuse to eat, show a decided drop in milk production, abort or have bloody milk or urine.

The veterinarian will examine the suspected animals and send blood samples to a diagnostic laboratory. There the blood will be tested to determine whether the animals have leptospirosis or are carrying it.

After the diagnosis is made, the veterinarian may treat the infected animals and initiate changes in herd management practices. Vaccination of susceptible animals may prevent spread of infection in a herd. —*Illinois Extension*

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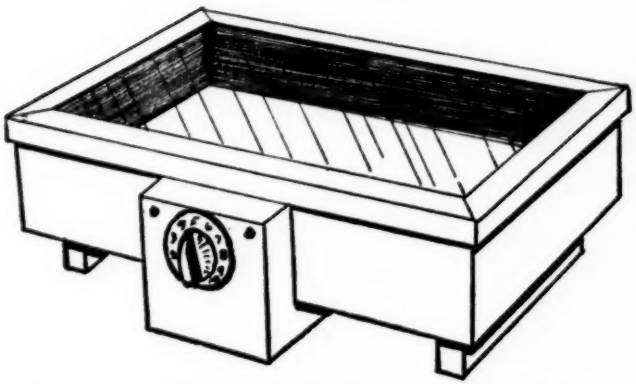

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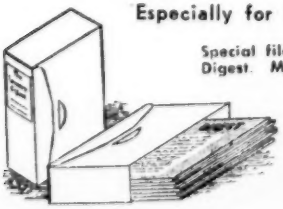

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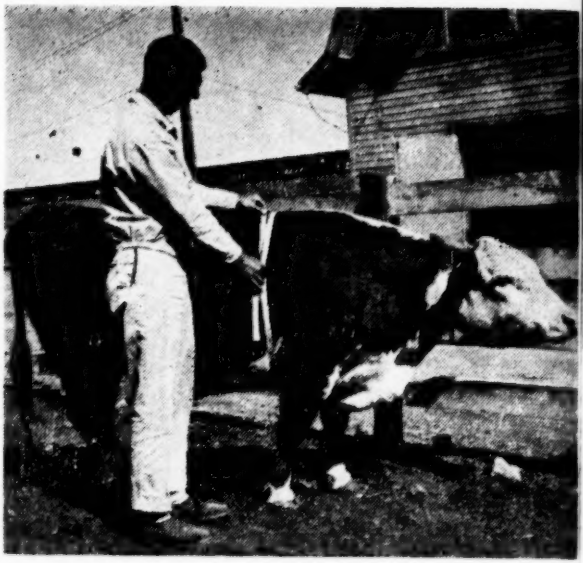

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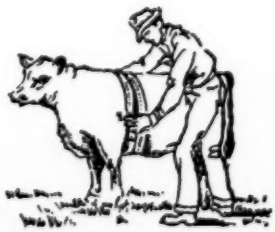
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